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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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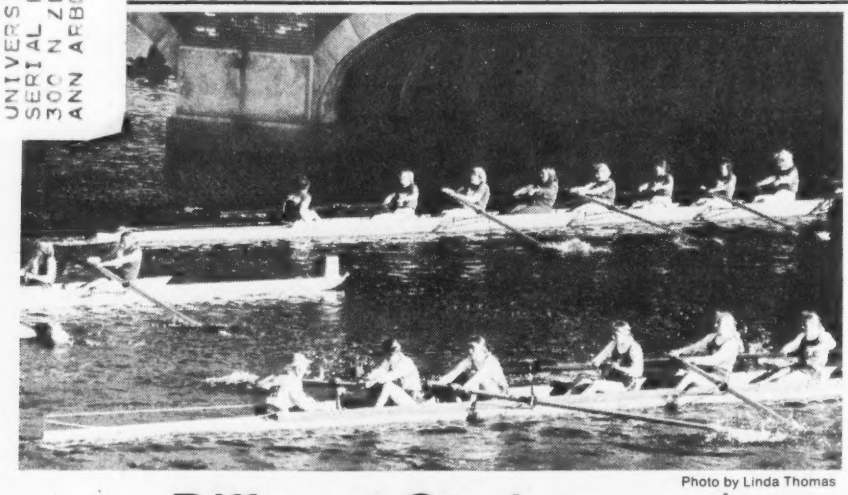


Photo by Linda Thomas

Different Strokes . . .

Three crews competing in the annual Head-of-the-Charles Regatta in Cambridge, Mass., race under a bridge on the Charles River. Two CPUs in Waltham, Mass., linked to terminals on the river banks helped time 720 entries. Story on Page 5.

IBM a DP Monopoly, Moved Against Rivals, Internal Memos Admit

By Catherine Arnst
CW Staff

NEW YORK — An IBM attorney admitted as early as 1963 that the firm maintained an "almost unchallenged monopoly position" in the computer industry, according to an internal company memo placed into evidence in the U.S. vs. IBM antitrust trial here.

Other newly introduced documents indicate IBM chose to unbundle its software and services prices from the hardware prices of its systems not only because of antitrust considerations, but also to control the growth of rival leasing companies.

The documents are part of a group that IBM has been trying to keep out of the public record in the case for the past nine years through claims of attorney-client privilege [CW, Nov. 7].

The 1963 memo — from Ken Seggerman Jr., an attorney for the General Products Division, to that division's president, John W. Hannstra — stated that "we tend to adjust our product line and our prices not in response to competition in general, but to thwart competition on an individual basis."

This was because "our secondary objective, to which we have mistakenly given too high a priority, has been to maintain a relatively stable rate of growth," Seggerman said.

To meet that goal, IBM increased its rental and profit margins "in the face of gradually increasing competition (for example, the increase of 'normal' profit from 30% to 35%) and we have increased purchase prices even more in relation to rentals in an attempt to 'manage' the flow of profits despite much lower purchase rental ratios of our competitors," Seggerman told Hannstra.

The attorney asserted that it made "better business sense and better antitrust sense" to respond to long-term trends in the marketplace rather than current and near-term growth.

"I am confident that [IBM] could also survive retrenchment to meet the demise of our hitherto almost unchallenged monopoly position," Segger-

(Continued on Page 6)

Bill Would Create Privacy Board

By Nancy French
CW Staff

WASHINGTON, D.C. — A bill has been introduced in the House of Representatives that would create a Federal Information Practices Board to review and report on fair information and privacy practices of government agencies and to a certain extent business organizations.

In keeping with the recommendations of the Privacy Protection Study Commission issued last July, the board would have no enforcement powers. However, it would oversee implementation of the Privacy Act of 1974 — a function now left largely undone.

The board would also assume some of the functions concerning the private sector previously performed by the now defunct Privacy Protection Study Commission that conceived it.

Introduced by Representatives Barry Goldwater Jr. (R-Calif.) and Edward I. Koch (D-N.Y.) only a week before Koch was elected mayor of New York City, H.R. 9986 assigns the board responsibilities for reviewing the effect of governmental and business information practices on individuals and their privacy.

It also assigns to the board the function of "investigating" the privacy implications of transnational data flows, electronic funds transfer, criminal history information and census activities.

The board would be composed of five full-time members appointed by the President and approved by the Senate. They would include persons repre-

(Continued on Page 2)

Senate Launches Trial EFT Bill

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A U.S. senator has introduced legislation that would permit banks and other financial institutions to establish Electronic Funds Transfer (EFT) facilities despite branch banking laws that currently limit the proliferation of EFT terminals.

Characterizing his bill as a trial balloon, Sen. Thomas J. McIntyre (D-N.H.) said that while the legislation would implement the recent recommendations of the National Commission on Electronic Fund Transfers [CW, Nov. 7], its chief intent "is to

(Continued on Page 6)

Single Modem Combines Data Sets From Vadic, Bell

By Ronald A. Frank
CW Staff

SUNNYVALE, Calif. — A microprocessor-controlled modem that is reportedly compatible with three commonly used low-speed data sets has been introduced by Vadic Corp.

The VA3467 can automatically recognize data received from a Bell System 103 and 212 and a Vadic 3400 data set, according to the vendor.

Vadic originated 1,200 bit/sec full-duplex transmission of data over a two-wire facility with the VA3400; this concept was followed several years later by AT&T with its 212 unit. The data sets use different modulation frequencies, however, and are not compatible.

The VA3467 is the first modem to combine both the Vadic and Bell capabilities into one unit along with the Bell 103 (300 bit/sec) speed, a spokesman claimed.

The automatic recognition sequence that identifies an incoming signal to the VA3467 operates under microprocessor control and does not disturb normal connect protocols for any specific modem, Vadic said. Terminal interface operation is transparent to the modem type used.

Computers that are compatible with any of the three modem types used in the VA3467 will operate with the unit "without altering hardware and software," the company said.

Users who want to order the VA3467 without its full capabilities can later upgrade the unit in the field depending on modem combinations installed, the spokesman noted.

(Continued on Page 5)

'Marginal People'

By Don Leavitt
CW Staff

NEW YORK — "Lots of programmers ... struck me as marginal people" and "managers use structured programming to de-skill and control their programmers" are keystone thoughts of a recent book describing the "routinization" of programming in the U.S.

In *Programmers and Managers*, sociologist Philip Kraft said he got to know many programmers as neighbors, students and colleagues in Binghamton, N.Y. He tagged them "marginal" just before noting "they didn't fit neatly into the stereotypes commonly applied, however unjustly, to engineering workers as a whole.

"They did not look like engineers are supposed to look (crew-cuts, narrow ties, penny loafers, etc.), nor were they taciturn and awkward around nonprogrammers. They did not appear to be particularly conservative, either politically or socially."

And, finally, "many were women."

On the other hand, Kraft added, if programmers could "pass" as nonengineers in a nonengineering world, "they were not exactly academics or managers or salespeople either."

After outlining the myriad titles

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Judge Agrees to Replace Examiner

By Catherine Arnst
CW Staff

NEW YORK — Judge David N. Edelstein granted "with reluctance" a government motion that the person it requested to examine IBM files in the U.S. vs. IBM antitrust trial now be removed.

Herbert H. Isaacs, a director of Arthur Young & Co., was appointed by Edelstein in August to search IBM corporate files for statistical information on the firm's installed systems [CW, Sept. 12].

The government originally suggested Isaacs' name, but then requested its removal [CW, Oct. 31] after IBM filed a writ of mandamus with the Second Circuit Court of Appeals complaining of a conflict of interest — the accountant was also working for Memorex Corp. as a paralegal in its antitrust suit against IBM [CW, Oct. 10].

In his order last week, Edelstein said "the court remains convinced that its appointment of Mr. Isaacs as examiner was within its sound discretion.There was not then, nor is there now, a conflict of interest or appearance of conflict resulting from Mr. Isaacs' nonadversarial support role with Memorex.

"Despite these convictions, however, the court has determined with reluctance that the elements of delay are such that the government's motion should be granted. Resolution of defendant's proceeding in the court of appeals is not likely to occur until sometime in 1978." The judge added that he hoped the expedition of the 2-1/2-year-old trial would be served by granting the government's motion.

However, IBM will probably take issue with this order, too, as it contains some of the same procedures to which the firm objected when Isaacs was appointed. IBM's writ complained that the government did not consult with it prior to submitting a list of persons to the court for appointment and that the firm had only one day to object to any of those persons.

Edelstein's current order also allowed IBM only 24 hours to respond to a list of government-selected names. In addition, IBM wants only a lawyer, not an accountant, to be appointed as examiner, while Edelstein "is convinced that [the] choice of a nonlawyer to act as examiner is entirely appropriate and may, in fact, serve to facilitate completion of the duties of the examiner," his order said.

Bill Creates Privacy Board

(Continued from Page 1)

senting law enforcement, business, computer and communications technology, civil rights and liberties and information security, Koch said recently on the House floor. Each member would serve for only one four-year term.

A part of the executive branch, the board would monitor and investigate compliance with federal fair information practices laws, including the Privacy Act of 1974, the Fair Credit Reporting Act, the Fair Credit Billing Act, the Family Educational Rights and Privacy Act of 1974, the Freedom of Information Act and the Government in the Sunshine Act.

No federal agency could publish any proposed rules implementing a fair information practices law without first consulting with the board, according to the bill.

In addition to its watchdog function, the board would also directly assist individuals with privacy complaints.

With a staff of as many as 50 civil servants, it would assist those individuals by providing them with clear statements of their rights and remedies under the applicable federal law and identifying the persons responsible for administering the appropriate law.

The board would also prepare and submit to the President and Congress an annual report that included a statement of its activities during the previous year and recommendations for action by the executive, legislative and judicial branches of the government and by the states and private sector.

The annual report would also include a review of any new information technologies and practices developed or marketed during that year.

The board would also prepare and submit to relevant agencies or business organizations, the President and Congress the results of any investigation deemed by the board to be "of significance."

H.R. 9986 gives the board subpoena power as well as the power to hold hearings and take testimony under oath.

Any agency that receives a report on an information practice which the board finds to be in violation of a federal fair information practices laws would have to prepare and submit to the board, the President and Congress a written statement describing the measures taken to alleviate or remove any problems or deficiencies identified in the report, the bill said. This provision does not apply to business.

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Probe Finds Sci-Tek Violated Code of Conduct

By Ann Dooley
CW Staff

BOSTON — A state investigative committee has found Sci-Tek Associates, Inc. guilty of two violations of the state code of conduct and has barred the company from any further participation in a controversial $23 million facilities management contract for the Administration and Finance Department (A&F).

While investigators concluded there was insufficient evidence to press criminal charges against the New Hampshire firm, Sci-Tek will be subject to administrative sanctions, state officials said.

And, as another result of the investigation by the Attorney General's Office, DP consultants will no longer be able to vote on any DP procurement selection board in Massachusetts, they added.

The conflict of interest charges were made when it was discovered that two Sci-Tek officials were members of the contract selection committee that awarded the facilities management contract to Electronic Data Systems, Inc. (EDS) [CW, Sept. 19]. Sci-Tek and EDS were jointly involved in a $1.6 million contract in Tennessee during the time of the Massachusetts vendor selection process.

No action has been taken against EDS; that company is free to rebid for the contract if it wishes.

In an investigation requested by Gov. Michael S. Dukakis, the State Attorney General's Office interviewed other members of the contract selection board, Sci-Tek and EDS employees and Tennessee officials; it also reviewed records of communications between EDS and Sci-Tek.

The investigators found Sci-Tek had violated state codes whch prohibit conduct that might give the impression or raise a suspicion of improper activity.

In reviewing the selection process, it was found that EDS ranked fifth out of a field of five vendors which met the technical requirements. The first three bidders were invited to participate in the second phase of bidding; the other two were advised to exercise their own busines judgment.

However, all five bidders were very close in their bid responses, the investigators reported, and EDS believed there was no real impediment to its being awarded the contract. EDS' confidence was high, the firm's legal counsel said, because two of the five bidders were subsequently disqualified, the technical review was only 30% of the total evaluation, certain misunderstandings about parts of the EDS proposal had occurred and EDS' cost proposal was much lower than those of the three top contenders.

Although Sci-Tek became interested in the Tennessee contract in late December, about the same time as the technical review, both companies claimed there was no contact between them concerning the Tennessee contract until early February.

Several phone calls were made between the two companies (one on the same day Sci-Tek became interested in the Tennessee contract), but both firms said they were concerned only with the Massachusetts contract.

In the contract award procedure's cost performance proposal phase, which took place in January, all selection board members ranked EDS first among the bidders. One week after that evaluation, EDS, Sci-Tek and Tennessee officials met to discuss the contract.

EDS asserted it had no knowledge that a vote was about to or had just taken place by the Massachusetts board when it was first contacted by Sci-Tek. Company officials also stated that the Tennessee contract was an "arms-length transaction" only. After examining the contract, the investigators concurred with that statement.

EDS officials also said they sought and received assurances from Sci-Tek that there would be no conflict of interest between the two contracts. Sci-Tek requested and received such an assurance from the selection board, although neither the A&F Secretary nor the Attorney General were consulted, investigators learned.

Investigators did find that Sci-Tek's conduct in "discussing the [Tennessee] proposal with individuals associated with the firms they were evaluating for the Massachusetts contract before the results of the evaluation were final and public" violated Massachusetts law.

'Wasting Their Time'

BOSTON — Sci-Tek Associates, Inc. has bid on a Massachusetts merit rating board contract despite a pronouncement from the governor that the company should not be involved in any state business.

Gov. Michael S. Dukakis made the statement after an Attorney General's investigation cited Sci-Tek for improper behavior concerning a conflict of interest in a recent state contract award.

"I'm surprised to learn [Sci-Tek] submitted a bid," Dukakis said.

Sci-Tek, which had been working under a no-bid contract for the Merit Rating Board, was scheduled to complete that contract Oct. 1. Bidding for the new contract is currently in progress and a contract decision is scheduled to be made Dec. 12.

Although Sci-Tek cannot be prohibited from bidding on any state contract, it would be "unfortunate if [the company] continued with that contract," Dukakis stated.

The governor has no direct influence on the contract selection board since it acts independently, but Dukakis hopes the board will take into consideration the Attorney General's findings, according to Alan Raymond, press secretary.

"They [Sci-Tek] aren't going to get it, they're wasting their time," Dukakis is reported to have said when he heard of Sci-Tek's bid.

Programmers 'Marginal'

(Continued from Page 1)

and job functions he found related to programming, Kraft determined that "some software workers are primarily engineers, while others are high-powered clericals."

It is the engineering efforts of some of these software workers — rearranging and redesigning work tasks and simplifying them so they can be done by less skilled workers or by machines — that has provided management with the means of "de-skilling" the average programmer's occupation, he said.

Structured programming has become just such a tool in the hands of today's management, Kraft said, even though theoreticians such as Edsgar Dijkstra and David Gries "have stressed in their writing that they see in structured programming the possibility of enlarging, rather than diminishing, the skills, knowledge and understanding of the average programmer."

But managers have always been selective in what they use to further their own ends, "ends which are invariably informed [sic] by the desire to reduce costs and increase profits," the sociologist noted.

"Barely a generation after its inception, programming is no longer the complex work of creative and perhaps even eccentric people. Instead, divided and routinized, it has become mass-production work parcelled out to interchangeable detail workers," he said.

Restrictions Imposed

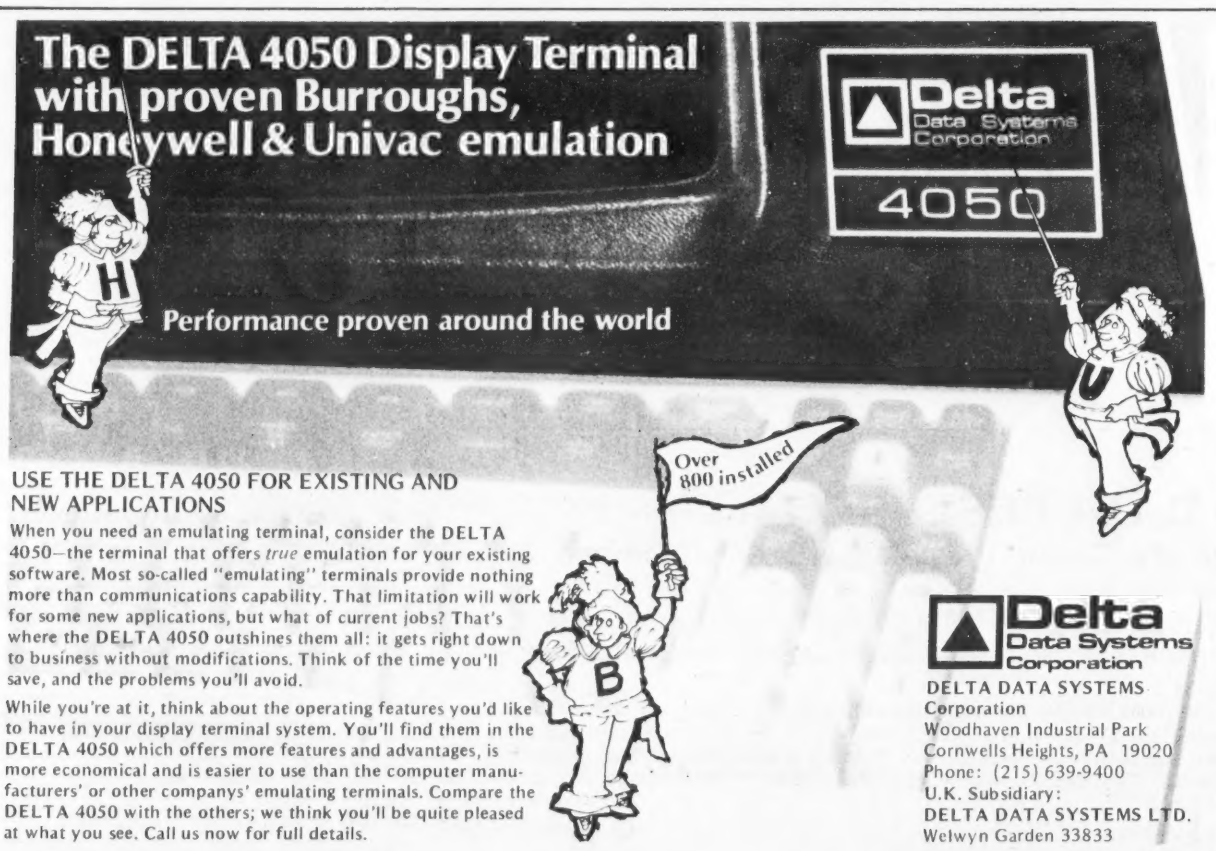
Structured programming methods impose restrictions on the number and type of logical procedures a programmer may use.

There is, he continued, a similar restriction, imposed by the "logic" of the structured programming technique being used, on the kind and quantity of information that may be called upon for calculation.

To aid in the production of a standardized product, structured programming as a way to structure work has been complemented by various social arrangements to structure the relationships between software workers, Kraft said, noting the most important of these "arrangements" are modular programming and chief programmer teams.

The chief programmer team divides the "conceptual architectect" and his assistants from the people who actually write the code; modular programming "carries the process a step further" and establishes divisions between the detail workers themselves, he asserted.

Kraft's 118-page soft-cover book is part of the Heidelberg Science Library, costs $6.90 and can be ordered from publisher Springer-Verlag, 175 Fifth Ave., New York, N.Y. 10010.



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720 Crews Clocked

Backup Systems Prove Worth During Regatta

By Molly Upton
CW Staff

CAMBRIDGE, Mass. — How much timing backup is necessary for a regatta in which 720 entries are rowing against the clock?

The 13th Annual Head-of-the-Charles Regatta had terminals logged onto two Digital Equipment Corp. Decsystem-10s, with another one standing by, and about six people armed with digital readout stopwatches.

By the end of the regatta, which lasted six and a half hours and provided competition for more than 3,000 oarsman and oarswomen ranging in age from 17 to 77, two of the CPUs had been pressed into action and the stopwatches had proven their value.

To time the contestants, an operator at the starting line used an on-line terminal to key in the appropriate bow number and starting time of each boat.

A similar entry was made at the finish three miles upstream on the Charles River, where terminals were housed in a trailer hauled in for the regatta. Stopwatch times were also recorded at the start and finish.

At ADP First Data Corp., in Waltham, Mass., a Decsystem-10 subtracted the start time from the finish time and ranked the boats in their order of finish, indicating their times to a tenth of a second. The system also calculated handicaps, based on age, for the "veterans" race.

The crews started about 10 seconds apart, so there was little way for contestants or spectators to know who among the 40 entrants in each of the 18 races had emerged victorious.

This year, the backup systems proved not only prudent but necessary. During the 16th event, the starting terminal disconnected, according to regatta director Lawrence Copley.

A series of human errors ensued, such as the reopening of the file on event 15, which delayed the reporting of results in events 15 through 17. Normally the regatta is able to issue unofficial results about 10 minutes after an event is over.

While dealing with the problem of where to find the data from event 16, the starting terminal operator switched over to the second system at ADP First Data for events 17 and 18, Copley said.

But at the finish, times for event 17 were being logged on the first system.

Because of the problems, some times were lost in the system, but they were recorded on the terminals' logs, Copley said.

After comparing stopwatch times with the times recorded on the terminal printouts and those stored in the system, the timing committee then entered the appropriate times into one system, which calculated the results.

Postrace Adjustments

Despite the hassle, the regatta managed to award first-place prizes while crews were attending the postregatta reception. Prior to determining official results, judges' observations of course violations and decisions on protests had to be keyed into the system, which then issued new rankings.

After examining the course of events, the regatta directors concluded the software does not display enough status information and/or recovery instructions for use by people unfamiliar with the software structure.

But the software, written by Cambridge Boat Club treasurer Chuck Roth, does anticipate a lot of problems and helps avoid them, Copley said.

Modem Handles Three Data Sets

(Continued from Page 1)

The VA3467 is being registered with the Federal Communications Commission for connection to dial-up lines using the plug-and-jack arrangement approved under Part 68 of the commission's regulations. The unit also accommodates Bell Data Access Arrangement (DAA) configurations, Vadic said.

According to the company, the VA3467 "satisfies every answer mode application for switched network data transmission in asynchronous data format at rates from 0- to 1,200 bit/-sec." Users can install modems without modifying software or establishing new connect procedures for remote terminals, the spokesman said.

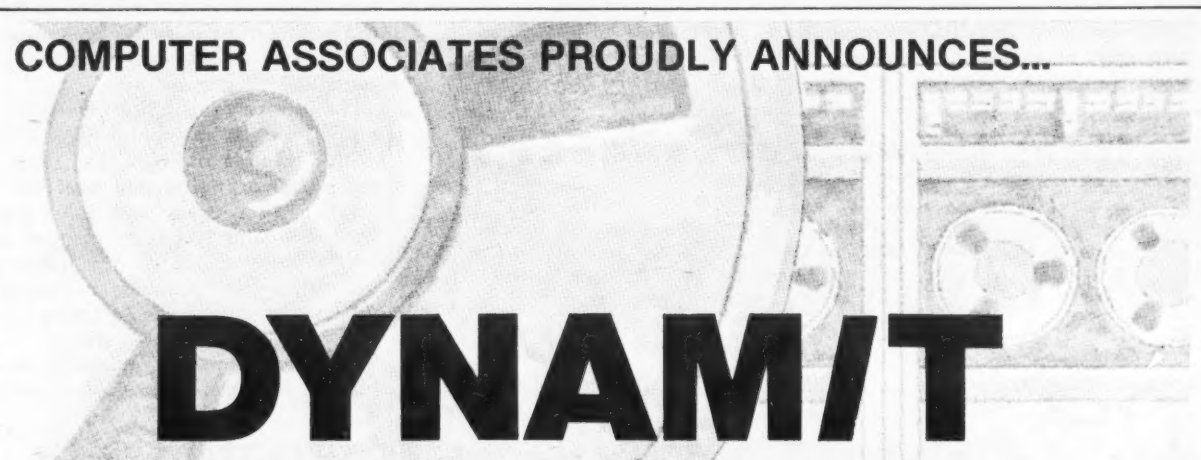
The modem utilizes an Intel 8035 microprocessor and includes continuous self-test, analog loopback/busy out, digital loopback and transmit reversal capabilities.

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Memo: IBM 'Almost Unchallenged Monopoly'

(Continued from Page 1)

man stated.

In the area of competition with leasing companies, the government has charged that in the late 1960s IBM considered unbundling services and instituting a "subsequent user policy" as a method of stopping the encroachment of leasing companies in the industry. One of the newly introduced memos seems to bear out this contention.

Although "any IBM executive who suggests that our DP service contract price should be even partially unbundled is likely to be regarded by his associates as a man in need of a vacation," such a policy was urged by Hilary Faw, assistant treasurer for IBM, in an August 1968 memo.

By then the Department of Justice had begun investigating IBM on antitrust grounds, and "legal opinion from both outside and inside counsel could suggest that the IBM pricing practice of a single charge for the combination of services could be regarded as a tie-in sale under the Clayton Act," Faw warned.

"A self-imposed unbundling internally designed and implemented by IBM" would be more desirable than any remedies resulting from a lawsuit, partially because it could be designed to slow down the inroads leasing companies had already made on IBM's installed base, Faw said.

Unless IBM realized "that leasing companies have already made it impossible to do business as usual in the future," Faw said, "we will be predisposed to a step-by-step retreat in the face of increasing demands by leasing companies to committing more and more free support services to subsequent users.

"If this step-by-step erosion is permitted to occur, we may find it legally impossible at some later time to impose a price for these services."

An unbundling announcement had to be timed right, he cautioned. Financial difficulties for leasing companies were expected to become "commonplace in the next two years. The threat of an antitrust violation stemming from the bundling superimposed on the possibility of numerous leasing company failures poses a treble damage exposure of unbelievable magnitude," Faw said.

IBM began unbundling user services in 1969.

The firm also began in the 1968-69 timeframe to change its policies toward leasing firms as opposed to other IBM users by refusing to provide services for other than the first user of a system. This policy was invoked to hurt the leasing companies, the government charged after studying another internal IBM memo.

That document is a draft for presentation to a Management Review Committee meeting on Nov. 27, 1968. It suggested dropping the practice of treating first users and subsequent users the same and recommended using "as rationale that administration of old policy [is] becoming increasingly difficult to apply in an equitable manner, or something to that effect."

The suggestion was evidently made in response to the threat of a lawsuit by DPF&G, a leasing firm, over the way the old policy had been administered.

"Say nothing to [Harvey] Goodman [of DPF&G] — but get this out before he has a chance to file his complaint," the memo said. "Take away Goodman's principle source of complaint" and "halt accumulation of damages to leasing companies.

This would cause "our move to come before [the] Goodman suit when and if he files. [The] public will not *know* our move was related to the suit, and we can avoid comment that we are merely reacting to outside pressure," it said.

"In retrospect (assuming we unbundle) [the] public will realize this was a strategic first move of [a] thoughtfully conceived plan.

"If Goodman does file, he is likely to be regarded as some kind of nut (he will be in the position of trying to enforce antitrust laws, violation of which are helpful to him and to other leasing companies)."

The authors of all these documents were highly placed corporate officials who were also members of IBM's executive staff, supporting an earlier claim by the government that "IBM's highest corporate officials recognized IBM's monopoly power ... and undertook ... to minimize the likelihood of detection and liability."

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Senate Gets Trial EFT Bill

(Continued from Page 1)

provide the necessary catalyst to an understanding of how best to serve the banking needs of the American public in the 1980s and beyond."

McIntyre, who chairs the Senate Banking Subcommittee on Financial Institutions, stressed the need "to modernize our banking laws with regard to the geographic placement of banking services.

"At the very least," he told the Senate, "financial institutions must be permitted to service their customers through electronic means ... where they live, work and shop."

In addition to overriding the traditional bank branching laws embodied in the 1927 McFadden Act, McIntyre's bill addresses such issues as consumer privacy, EFT facilities that are shared by financial institutions and the role of government in EFT.

The Subcommittee on Financial Institutions will hold hearings on the proposed legislation early next year.

No Artificial Barriers

The Bill S. 2293, expresses the EFT commission's finding that consumers will benefit from the extension of EFT systems through competition among financial institutions and other business enterprises. Neither geography nor government regulation should be allowed to create artificial barriers to EFT growth, the bill said.

McIntyre proposed that all federal financial institutions — national banks, federal savings and loan associations and federal credit unions — be permitted to establish or use EFT systems in the U.S. and abroad.

In general, the bill would not permit these federal organizations to offer deposit services through EFT systems outside their home states. It does, however, provide for two exceptions to this rule: out-of-state deposit services may be made available when state laws permit it or when an institution's "natural market area" extends beyond the state's boundaries.

The bill specifically authorizes a financial institution that owns or operates an EFT system to make it available for use by other financial institutions, retailers or other businesses through franchise, lease or corresponding arrangements.

The proposed legislation reaffirms tht the antitrust laws will apply to EFT services to ensure the development of competitive systems. State mandatory sharing statutes are particularly preempted by the federal bill on the ground that they "will tend to thwart the formation of rival networks in those states."

Under McIntyre's bill, federal, state and local governments would be prohibited from accessing a customers' financial records unless the government had the customer's consent, a reporting requirement legally authorized access or a subpoena or warrant for the records had been issued.

The Federal Reserve System's Board of Governors would write all disclosure regulations for financial institutions offering EFT services to their customers.

Finally, the proposed legislation would press automated clearinghouses (ACH) to allow thrift institutions to use their ACH services. Federal Reserve bank services would be withheld from an ACH if the ACH were not open to all financial institutions.

In addition, with the exception of the services they provide to ACHs, Federal Reserve banks and federal home loan banks would not be permitted to enter into the EFT business.

Opens Competitive Bidding

County Revokes OK of Sole-Source IBM Order

By Jeffry Beeler
CW Staff

BAKERSFIELD, Calif. — Nearly three months after approving the sole-source procurement of an IBM computer system, the Kern County Board of Supervisors here has admitted it erred and has agreed to let other vendors bid for the contract.

"We in government are human just like everybody else, and sometimes we make mistakes," Supervisor John Mitchell conceded, referring to the board's initial endorsement of the sole-source procurement.

The council's Oct. 18 decision to rescind a long-standing purchase order for an IBM 370/158 system marked an abrupt reversal in the five-man board's attitude toward competitive bidding.

Ever since it had approved the acquisition of the 370/158 during a budget hearing last July, the group had strenuously resisted suggestions from IBM rivals that it open the county's contract to competitive bidding.

Echoing the sentiments of Kern County DP director John Veon and his staff, board members had maintained that requesting and evaluating bids from rival mainframe vendors would seriously delay the acquisition of a much-needed supplement to the county's existing IBM 360/40. They also had insisted that installing a non-IBM computer system would create serious training and software conversion problems.

Opposition Crumbled

In early October, however, the board's opposition to competitive bidding suddenly crumbled when T.H. Busby of Univac's Southern California Public Sector wrote the group a letter informing it of the IBM 3031's availability and adding that "if the county had waited one month, it would have been able to procure a new machine [and] would have saved at least 37% on the purchase price."

Busby's letter reached the supervisors nearly a week before Veon's office issued a similar warning, and its contents earned the DP department a sharp rebuke from the board members. "We were very concerned that someone outside the county government could notify us of a potentially cost-saving alternative to the IBM 370 before our own data processing department did," Mitchell explained.

That concern, however, apparently has not shaken the board's confidence in the DP department's competence or integrity. In fact, when it scrapped the original purchase order for the 370/158, the board immediately appointed Veon and his staff to write specifications for an alternative computer system.

Mitchell and his colleagues expect to see the results of the department's work by the end of the month and then send bid requests to several as yet unspecified computer vendors.

Local Univac representatives Len Vinson and Phil Mitchell, on the other hand, charge that Veon and his staff deliberately misled the board about the technical capabilities of non-IBM computer equipment. "They (the board of supervisors) were supplied with totally inaccurate product information," Phil Mitchell complained.

Both Univac representatives also accuse Veon and his colleagues of being biased in favor of IBM, and Vinson has expressed fears that the DP department's upcoming product specifications will reflect that alleged prejudice.

John Mitchell dismissed those fears as unfounded and added that he "had no reason to believe" that Veon and his staff had ever intentionally fed the board faulty technical information about IBM's or any other company's computer systems.

The controversy surrounding the DP department's alleged deception and vendor bias has helped fuel a continuing and often bitter contract struggle between Kern County officials and several IBM competitors, notably Univac.

That struggle has revolved around vendor efforts, until recently unsuccessful, to force the Board of Supervisors to consider alternatives to the 370/158.

The roots of dispute here can be traced back to an April board meeting when Veon first advised the supervisors to opt for a sole-source procurement. In a detailed memo outlining his position, Veon argued that his department's growing DP workload had forced the county to acquire an additional computer system as soon as possible and that competitive bidding would seriously delay the installation.

Univac's representatives, however, were less than enthusiastic about Veon's proposal. Although neither Vinson nor Phil Mitchell disputed the legality of Veon's recommendation — in Kern County, as elsewhere in California, computer systems qualify as personal property and thus are exempt from the competitive bidding requirement — both men questioned the reasoning behind the decision.

They also insisted that Univac could offer the county a single 90/80 or a dual 90/60 with the same capabilities as the 370/158 but for $1.7 million less.

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Hammer: DP Creating, Also Easing Complexity

By Esther Surden
CW Staff

SEATTLE — Although society becomes more complex daily, technology is continuing to develop the tools to deal with that complexity, Dr. Carl Hammer, director of computer science at Univac, told a recent conference here.

Computers — which may be part of the complexity problem — can also be a part of the solution, Hammer said. Each step in the explosion of information has been accompanied by a development in computer processing to cope with the problem, he explained.

"Several areas in this electronic technology race have clearly emerged to warrant our admiration — and concern," Hammer said.

The first of these areas is computational speed, and its history can be illustrated by looking at the history of the symbol "pi."

The Babylonians computed pi to two decimals; in 1596 it was computed to 35 decimals. Now pi has been computed 100,000 decimal places using an IBM 7090, he said.

Another area of advancement has come in reading and processing information. This can be illustrated by comparing the amount of information a person can read and digest, even after taking a speed reading course, with the amount of information a computer can digest.

But those speedreaders who can read up to 1 page/sec are "still pikers," Hammer said, since current DP speeds exceed the equivalent of 1,000 page/-sec, even for the average system.

Storage and Retrieval

Great advances have also been made in the areas of data storage and retreival, Hammer pointed out. DP systems can "remember millions of names. Not only have we greatly increased our ability to store such large data volumes, we have also made it easier to retrieve them."

This ease of retrieval has created concerns over protection of privacy which have lead to regulation and legislation, he said.

A fourth area of admiration is the ability of electronic systems to perform complicated algorithms "effortlessly," Hammer said. Man is not even in the contest when it comes to computing these formulas, he indicated.

Communications is another aspect of data processing that has been unquestionably speeded up by computers, according to Hammer. When Christopher Columbus discovered America, he didn't know where he was or by what miracle he got there, he said, and it also took a long time for the world to understand that North America was not India, but a previously undiscovered continent.

In contrast, when man landed on the moon, he knew exactly where he had landed, how he got there, when he would return home — and with electronic communications, everyone else knew, too, Hammer noted.

Finally, "we must recognize the superior ability of electronic systems to respond to interrupts. Computers can respond to interrupts on the milli-, micro- and now even nanosecond level. In contrast, the most a human could respond to is about two interrupts per second."

All of these developments have been "catalytic" because of their size. "The electronic age is also the age of gigantics," Hammer stated. All problems come in large sizes, and the magnitude of the problems is staggering, he added.

Although computer systems are an integral part of the problem, the technological progress made so far has been contigent upon the availability of computer power, he pointed out.

"I don't take the view that electronic systems are a panacea" for these problems, Hammer said, but noted that despite all the problems we are surviving . . . We haven't really bogged down."

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Hammer Urges DPers to Meet National Needs

By Esther Surden
CW Staff

SEATTLE — The computer industry needs to explore the areas of computer science that will make the greatest contribution to the national need, Carl Hammer, director of computer science at Univac said at a recent conference here.

Effort should be invested in making data base management systems more functional, making man-machine interfaces more natural and developing better languages and better ways of producing programs, Hammer said.

The storage, maintenance and retrieval of data and information are "key" to efficient operations in society, making the management of the data increasingly important, he pointed out.

For that reason, the industry must push beyond the already existing relational data base system to include the concepts of fuzzy sets and associative processors, he said.

In the realm of hardware and interfacing, Hammer advised the industry to more beyond the present methods of interfacing with a system. Presently man interfaces with the computer visually via a CRT or tactilely via a keyboard.

The third channel for interfacing — the audio channel — is not used, he noted. Voice recognition and natural language translation and processing methods should be developed, he urged.

(Continued on Page 9)

Antifraud Plan Meets Opposition

Mass. Welfare Wants to Tap Private Bank Files

By Ann Dooley
CW Staff

BOSTON — The Massachusetts Welfare Department has proposed a computerized system for matching names and addresses of welfare recipients with bank savings accounts records in an effort to crack down on welfare cheating.

Under federal and state regulations, most people with bank accounts would not be eligible for welfare.

The department's "saving" efforts are being thwarted, however, by the State Banking Commission, which so far has refused to cooperate on grounds that the system would be a potential threat to the privacy of all bank customers.

As proposed, the system would give the department access to all bank records.

The Banking Commission has no power to stop the Welfare Department from examining welfare recipients' records, since under Massachusetts law, the depatment can do so with the voluntary cooperation of the individual bank involved according to Deputy Commissioner of Banks Edward Flynn.

Officials of the two agencies have met to work out differences, but to date those meeting have been largely shouting matches, Flynn said.

He claims the Welfare Department is not concerned with privacy but only wants the cooperation of the banking industry so it can carry out its matching system.

Sumner Hoisington, deputy commissioner of welfare, admitted that getting the banking industry cooperation will be a "major effort" since it is a decentralized system and that the Banking Commissioner's help would be important to the success of the project.

But the Welfare Department also believes it is important to protect people's privacy and security, he continued. The department follows the guidelines of all current state and federal privacy laws, he said.

Flynn contends that the major problem is that even though the department says it is only interested in welfare records, it would have access to everyone's records, nonetheless. The Welfare people don't seem to realize the far-reaching effects unlimited access to those records could have, he added.

A file management system similar to the one that will be used for the bank accounts has been used by the Welfare Department to cross-check Administration and Finance personnel files, Social Security files and Division of Employment Security files and match them with welfare files, Hoisington said. No one has ever complained about the use of files in that system, he said, adding that when the program was first implemented, task forces were set up to study the privacy questions.

Matching is based on a name-address formula rather than the Social Security number, a spokesman said.

When a "hit" occurs, humans take over to analyze whether a discrepancy is actually illegal, he said.

Previously, the DP work was done by Urban Data Systems, but the Welfare Department has proposed handling the computerized bank record system itself, according to Steve Kane, assistant commissioner for assistance payments. It will give the department more flexibility and more immediate retrieval of data, he said.

It is estimated that 2% of the 116,000 Aid for Dependent Children (AFDC) recipients are ineligible because they have savings accounts larger than limits set by the state, Hoisington said.

That amounts to illegal claims of $7 million to $8 million per year, he said, commenting "we could use that $8 million very nicely somewhere else."

The meetings between the two agencies are scheduled to continue, although neither side seems optimistic about resolving their differences, according to Flynn.

Hammer Urges National Efforts

(Continued from Page 8)

"We do not yet communicate in a natural language with a computer, not withstanding the Cobolphiles who say Cobol is like English. I say it is as bad as my German accent," he contended.

Software is another area of concern to Hammer, who said the industry needs better and more systematic ways to produce it. Although structured programming methods have gone far toward improving software results, automated methods are needed to make software capable of holding up under internal and external operational and data errors.

According to Hammer, following up on these needed areas of development, computer scientists can best serve the needs of the nation by producing solutions to at least parts of the nation's problems.

Hammer hopes computer professionals will be thought of by future generations as people who gave "meaning and hope to the lives of millions who now live in disease, ignorance and poverty."

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Farmer's Almanac Predicts Hard Winter Ahead

By Ann Dooley
CW Staff

DUBLIN, N.H. — What do a computer and a nail in the privy wall have in common?

The Old Farmer's Almanac, that's what.

The almanac uses computer calculations to help forecast the short- and long-term weather around the nation; despite such a modern innovation, however, it still has a hole in the corner so it can be hung on the privy nail.

A computer has been used for the almanac's weather forecasting for about the last 12 years, but that's a relatively recent development for the 186-year-old publication.

Every year the almanac predicts in rhyme the seasonal and daily changes for every part of the country, according to editor Judson Hale.

Although Hale wants to keep the almanac's method of weather prediction a secret, he indicated that data on sunspots, the electromagnetic field of the sun and the field's relationship to the earth's atmosphere as well as other variables are entered into Dartmouth University's time-sharing computer.

The system performs mathematical calculations and then Hale and two other almanac staff members make their predictions based on the numbers.

The daily forecasts tend to be less accurate than the seasonal forecasts, Hale admitted, but the overall forecasting is getting better all the time. The seasonal forecasts have an overall accuracy rate of about 80%, he said.

If the 1978 almanac and the computer equations prove accurate, the country could endure a winter similar to that experienced at Valley Forge 200 years ago. The weather will be colder than last year — continuously for the Northeast and intermittently as far west as the Great Plains.

The rest of the country will escape some of the cold, but Florida will freeze in December, according to the predictions.

Europeans Financing Study On Transborder Data Flow

LONDON — Six West European countries have hired a firm experienced in design and implementation of computerized data networks to undertake an empirical study of the socioeconomic impact of computerized data traffic across national boundaries.

West Germany, France, the Netherlands, Norway, Sweden and Spain are sharing equally in the financing of this study of transborder networks in West Europe, which will be performed by Logica, Ltd. here.

Logica designed and implemented the European Informatics Network (EIN) and the Dutch Communications Network (CNET).

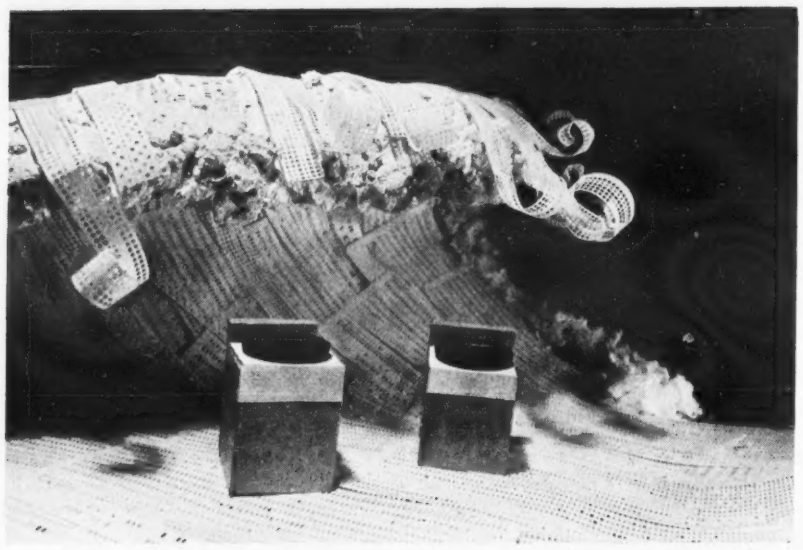
The project supplements current efforts of the Organization for Economic Cooperation and Development (OECD), which is comprised of 15 West European nations.

An OECD symposium last month in Vienna addressed to various issues of international data flow concluded that information on existing application methodologies and on the nature of data being transmitted are crucial to an understanding of this activity.

Attempting to compile such information, the Logica project will examine four types of networks: public networks, community or shared networks, service bureau networks and selected networks of private international companies.

The project is especially concerned with privacy of personal data, such as credit information.It is expected to be completed in December.

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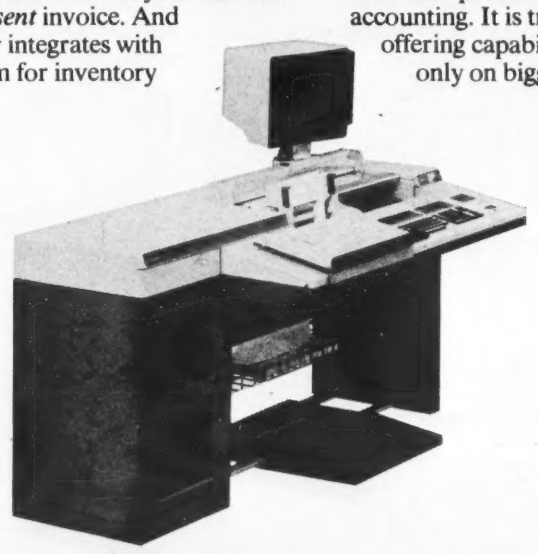
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Students Answer, Evaluate Questions

System Changing Earlham Education Process

By Tim Scannell
CW Staff

RICHMOND, Ind. — Earlham College here is developing a computer-based conferencing system here that may make a new kind of learning possible.

Rather than serving as a calculator or tutorial machine, the system performs more like a telephone that students use to answer, question and evaluate and comment on essay examinations, according to Dr. Jerome Woolpy, coordinator of the project.

Based on a Digital Equipment Corp. PDP-11/70, the system is expected to improve communications between students and professors as well as among the students themselves, Woolpy explained.

The system is presently installed on a pilot basis. A typical student, during the course of a 10-week semester, is assigned a code number known only to him and the instructor.

When chapters are assigned to be read or a lecture is given, that student is not tested by the conventional paper-and-pencil methods, but rather through one of 10 terminals.

After keying in, the student selects a category from the assigned reading. He can then either ask a question, answer a question already submitted by another student or offer a comment.

His input on the terminal is restricted to 200 words and a text editor is available for final corrections.

If the student chooses to answer a question, he has the option of rejecting those he feels are not suitable. Since grades are based not only on the evaluation of answers but also on the significance of questions, a student must become a good "teacher," Woolpy said. This prompts him to consider the subject matter differently.

In a comment, a student assigns a point value from 1 to 10 to the input from other students. Comments, are, however, not included in grade evaluation.

Whatever is entered through a terminal is available to all students for consideration and eventual feedback; the terminals have a reported retrieval time of 1 second.

Anonymity Promotes Honesty

Woolpy believes the system can prove to be an invaluable aid. Not only does it give the student a larger role in his own education, but it gives the instructor a clearer view of his class because he can track an individual's progress.

The anonymity involved, he added, also promotes a more relaxed and honest atmosphere.

The project, funded by a $124,000 grant from the National Science Foundation, will continue for 24 months.



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DP's Status Seen Block to Data Base Success

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — If you plan to implement a data base, be forewarned. The chances of succeeding in your enterprise are not very good, Barbara Fossum said at a recent conference here.

In a two-hour technical session entitled "Data Administration," the Univac data processing consultant explained that the prospects of creating a successful data base might be better if DP departments occupied a higher place in the corporate hierarchy.

At most firms, however, DP managers exercise much responsibility but little authority. As a result, they lack a strong voice in shaping data base administration policy, she said.

Fossum criticized the common practice of administering data bases at the staff level. The people who are appointed data base managers are often technical types who are ill-equipped in temperament and training to deal with the human relations problems they soon encounter in their new positions.

More importantly, though, data base managers are often held accountable for administrative matters over which they have little direct control, Fossum added.

Committee Approach

A more effective way of administering a data base is to create a committee composed of a technical manager and a board of high-ranking corporate executives, she recommended. In most instances, these executives should be the heads of the major corporate departments such as marketing, finance and manufacturing.

In theory, this management-by-committee approach places the power to formulate data base policy squarely in the hands of the departments that will use the base. In practice, however, the technique works only when the committee members are given the authority to make and enforce decisions affecting their respective departments, she warned.

And even then, the approach sometimes fails, especially in large corporations, Fossum added.

Fossum outlined five steps that she recommended users follow to help ensure a successful data base installation.

First, one should educate oneself and all the managers who will be involved in creating and administering a data base, she said. Users should hire consultants and seek advice from competitive vendors who have been trying to gain a toehold in their DP shops. Users should tap the technical expertise within their departments.

She also advised users to talk with current data base users that are similar in size and function to their own companies, to listen to their experiences and to pay particular attention to any problems they may have encountered.

Second, users should prepare a detailed installation plan and should try to predict what could go wrong. If the department establishes a formal mechanism for solving problems and keeps a log of any installation difficulties it encounters superiors will be prepared if the data base fails, she explained.

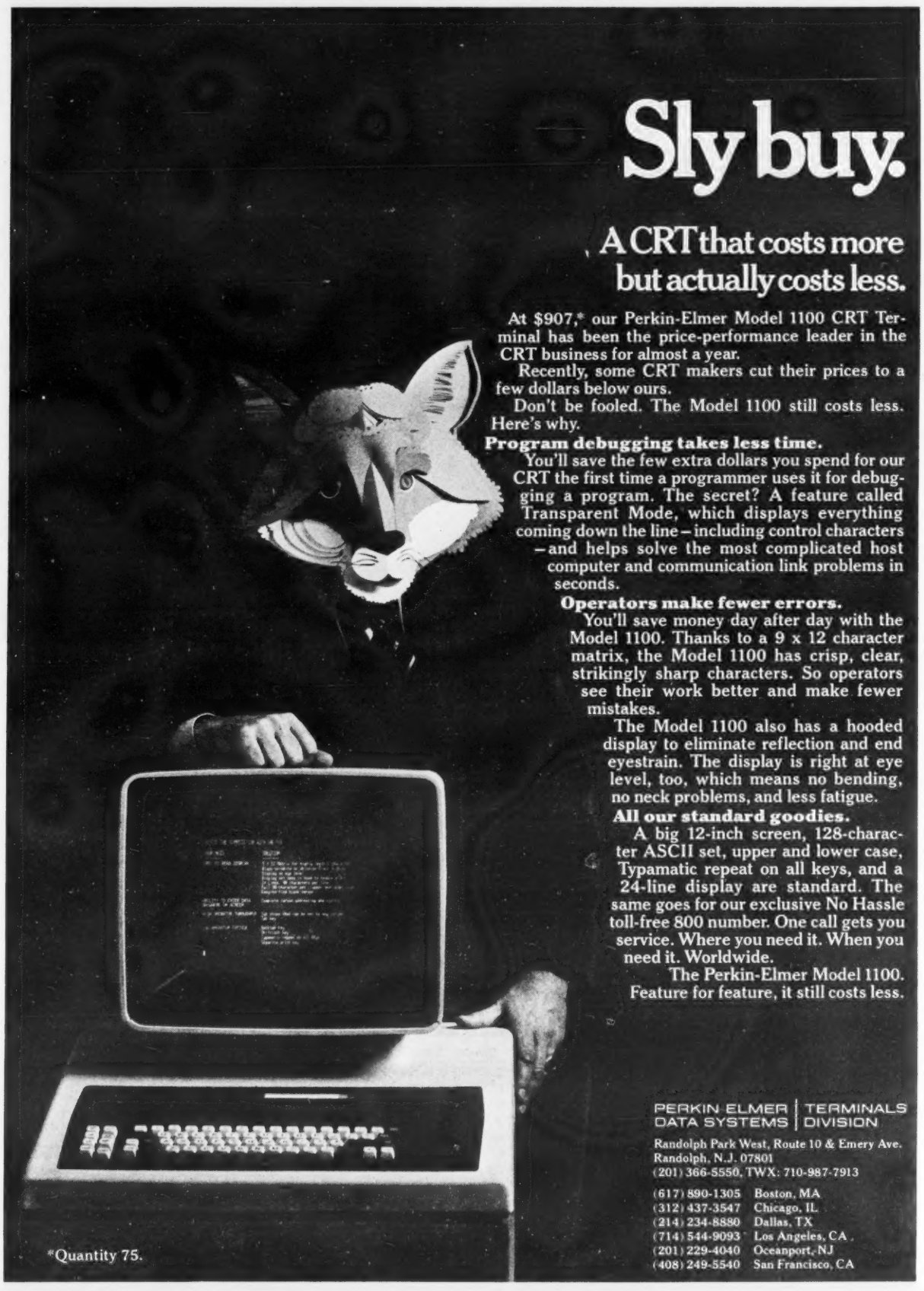
Third, the manager must obtain a commitment from all the personnel who will be implementing, using and administering the data base, Fossum said.

Fourth, a position for a technical data base administrator must be created. Ideally, the person who occupies the slot should be "applications-oriented" and should interact well with users, she said.

Fifth, problems should be brought into the open and superiors should be kept informed of progress — or lack of it — at every step of the installation.

In creating a data base, objectives should include planning and implementing an overall information strategy, increasing data utility and — most difficult of all — cutting installation costs, she said.

Users of prospective data bases should also make sure their DP managers enjoy the same executive status as other corporate department heads, Fossum suggested. "DP managers often have a better feeling than anyone else for the structure and organization of their companies," she said.







Framingham inmate demonstrates how to change a circuit breaker on computer printer as Honeywell's Richard N. Henderson looks on.

Training Program for

By Tim Scannell
CW Staff

FRAMINGHAM, Mass. — A DP education program initiated by a vendor for inmates of the Massachusetts Correctional Institute (MCI) here marked its 10th anniversary recently.

The program, which teaches keypunching, computer operations, programming and maintenance, offers "hands-on" experience to prison residents through the use of a Honeywell Information Systems, Inc. Series 200 computer. Between 1968 and 1972, inmates associated with the endeavor have provided more than $2 million in services to such state agencies as the Department of Education, the Department of Natural Resources and the Division of Corporations and Taxation.

The entire program began in 1967 when an inmate of the prison requested computer programming instruction after seeing related want ads in a newspaper. His request was referred to Malcolm D. Smith, then a manager at HIS' Programming Development Group, who agreed to set up a program at Walpole, a maximum security prison, in June of that year.

HIS donated books, supplies and computer time, which in the first year cost the company no more than $2,000. Instructors for the courses were volunteers who received no remuneration for their activities.

In 1973, the top programmers from MCI Walpole and MCI Norfolk, other prisons where similar courses had been started, were moved to MCI Framingham, a minimum security prison. HIS provided them with their own computer system.

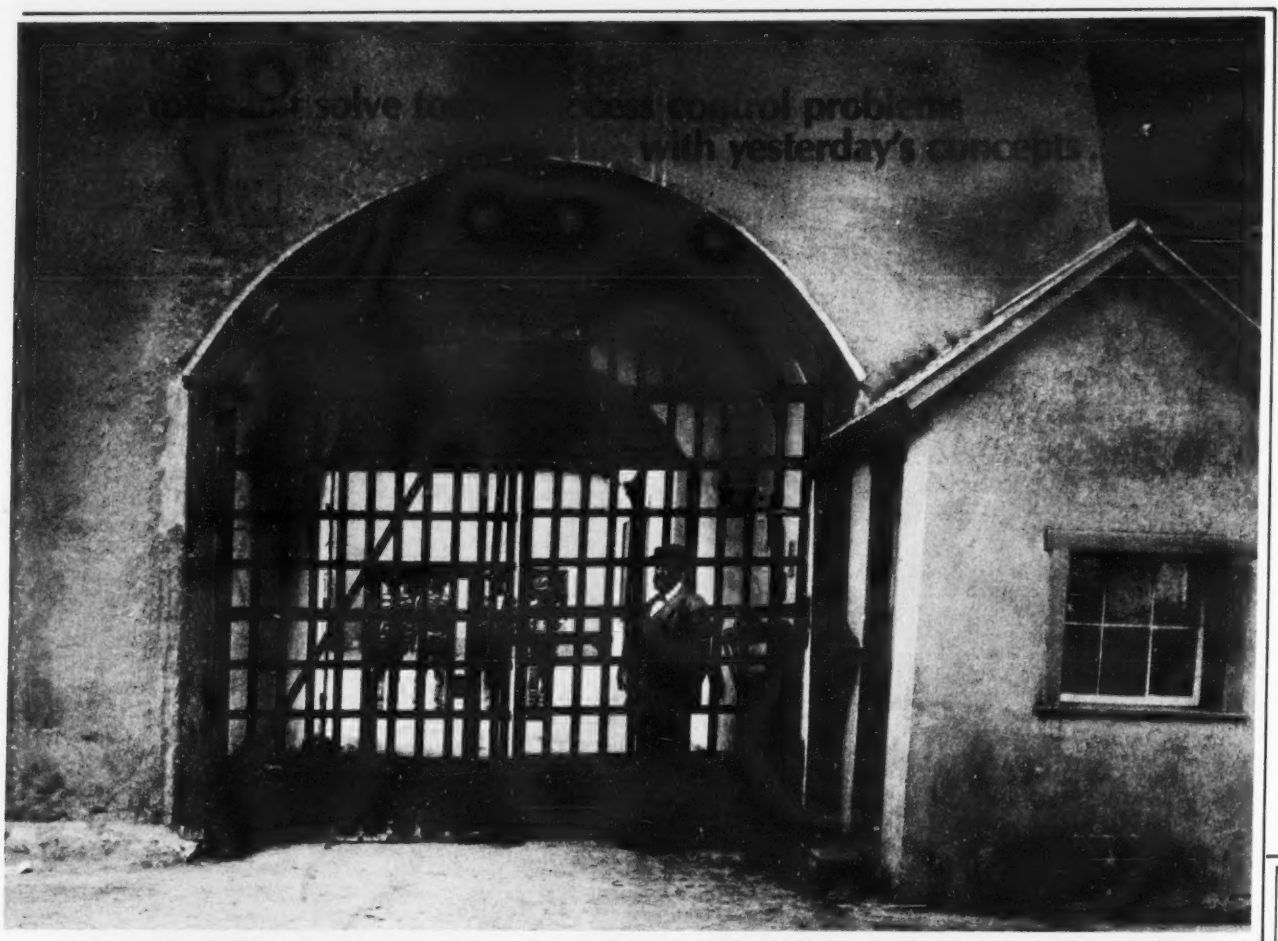
Despite the fact that the inmates cannot make sales calls on prospective customers, the senior programming group at Framingham has set up a service bureau business. Called Con'Puter Systems Programming, the business not only provides work experience and learning opportunities but, since the passage of a law in 1972, allows a prisoner to receive pay for the work he does.

One of the reasons the project is so successful, according to Smith, is that it is self-perpetuating. Two inmates are selected at the end of each class to give a small presentation at the next meeting.

Students are also required to teach new arrivals to the program and to prepare an instructor's manual at the end of their particular segment. These precautions were taken to assure the program would continue even if HIS instruction could not.

The program's dropout rate is fairly high. Of the 30 or 40 inmates that sign up for the program, only half are picked as qualified to continue on to more advanced skills.

The other half will eventually discontinue DP training, which consists of such basics as flowcharting and Cobol language introduction. Eight to 10, on the average, finally complete the course and dedicate themselves to the program on a full-time basis.





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Inmates 10 Years Old

Of the 650 or so inmates who have entered the program since its inception 10 years ago, nearly 400 have become proficient enough to get jobs as beginning programmers or computer operators, according to Richard N. Henderson, HIS' community services manager and current director of the program.

The 350 graduates who have been released from the institution not only have a number of professional successes, but a recidivism rate of 3% to 4% — a marked contrast to the estimated 70% nationally.

Henderson attributed the program's success to the "live" programming experience an inmate receives while in the program and the self-respect he has upon completion. Of course, he noted, some participants have obtained other types of employment upon leaving, but he feels their DP training was a factor in getting their first jobs.

Profits from Con'Puter Systems Programming have fully paid for the computer facilities at Framingham. The inmates pay all of their overhead, which includes electricity, a business phone and office and computer supplies.

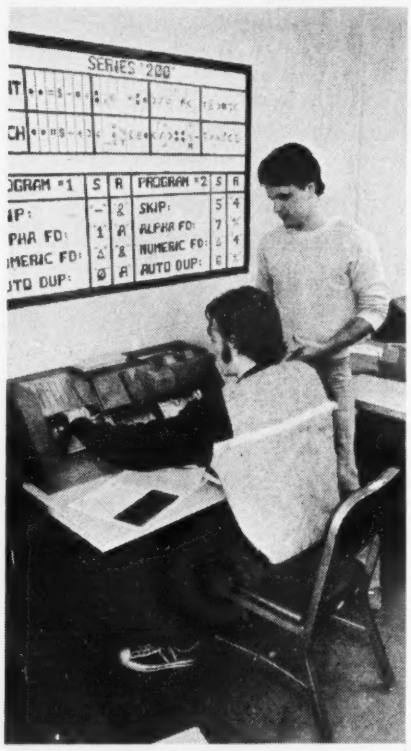
Clancy W. Spangle, HIS president, is optimistic about the program and satisfied with its results. At a recent press briefing here honoring the program's 10th anniversary, Spangle said he feels that each inmate involved with the DP training program is learning a skill and not just being taught.

An inmate, Spangle said, cannot be rehabilitated, but he can be afforded the opportunity to rehabilitate himself. It is his hope other industries will follow HIS' example and initiate work/training programs at similar institutions, Spangle said.





In top photo, Malcom D. Smith (center) discusses report with inmates George Magrath (left) and Richard W. Quillen. Below, inmate-instructor teaches programming.



Keypunch instruction is given to inmate by another who has already mastered the basic course.

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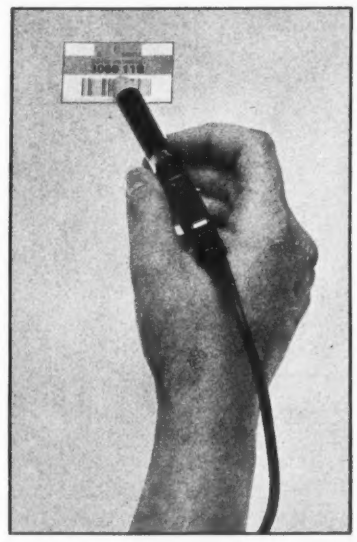
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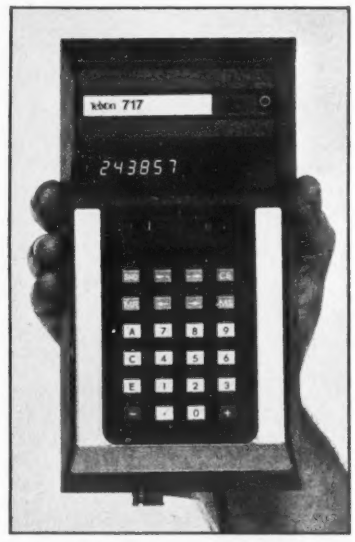


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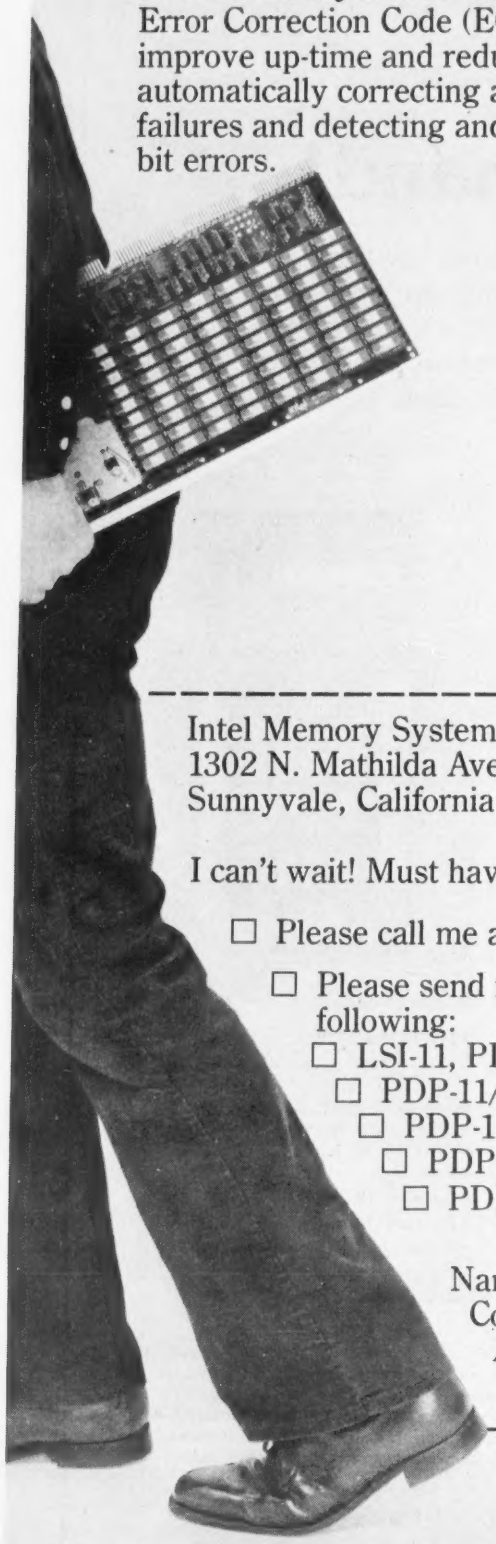
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Individual Order Seen Basic Unit In 'Logistical Information System'

By Ann Dooley
CW Staff

NEW YORK — To be effective, an information system must control data in a way that assures the right product will be in the right place at the right time, according to Donald Kruszenski of A.T. Kearney, Inc.

That function is the key ingredient, he said at a recent conference here.

"The whole operation, which I call a Logistical Information System, should begin with each individual order and continue on that basis," Kruszenski said. The order should be considered the ultimate profit/loss unit, he said.

An effective system should include order revenue, manufacturing cost, order gross margin, transaction costs, order processing, inventory carrying, outbound freight and commissions and any other specific criteria, Kruszenski said.

This kind of system should consist of a host processing node, an intelligent controller and operational data sets and application terminals that would be the focal point for user activities, he said.

As the system is implemented in a distributed data processing (DDP) environment, central controls decrease and user responsibility increases, he noted.

A logistical information system would provide product availability and inventory reliability, order cycle times dependability and accurate notation of specific packaging materials, Kruszenski said.

Benefits of the system would also include flexibility, post-sale support, pricing accuracy, invoicing on a complete basis, reduced order lead time, complete customer product information, faster credit reviews and increased cash flows, he said.

Implementation of a logistical information system in a DDP environment requires an integrated systems plan, education of management and selection of high-return area. During planning and implementation, results must be shown and goals reached one step at a time, Kruszenski advised.

Jerry Smith, senior manufacturing consultant to Rockwell International Corp., told the Info '77 audience about the actual conversion of Admiral Group, a division of Rockwell, to the type of system Kruszenski had described in theory.

The first step Smith undertook was to define Admiral's DP problems, which included a complex pricing structure, an inaccurate goods inventory, a manually oriented sales order processing system, high distribution costs, unrecorded sales and marketing analysis and cumbersome accounts receivable and cash applications.

The Admiral system was originally begun on-line but ended up in what amounted to a logistical information system, according to Smith. It included on-line sales order entry, real-time inquiry for availability and price and a real-time finished goods inventory control, he said.

It also included credit checking, on-line shipments reporting, on-line in-transit reporting and automatic invoicing, he added.

The hardware consisted of a Microdata Corp. 1600 Reality with an extension to make it more flexible, he said. It was networked from the host — an IBM 370/168 — with communication links to the two midsized Microdatas.

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Scouts at Jamboree Learn More Than Wilderness Survival Skills

By Denise Petski
CW Staff

MORAINE STATE PARK, Pa. — An exhibit provided by a vendor enabled more than 30,000 Boy Scouts who attended the 1977 Jamboree here recently to learn not only traditional wilderness skills, but also how to survive in a technological society.

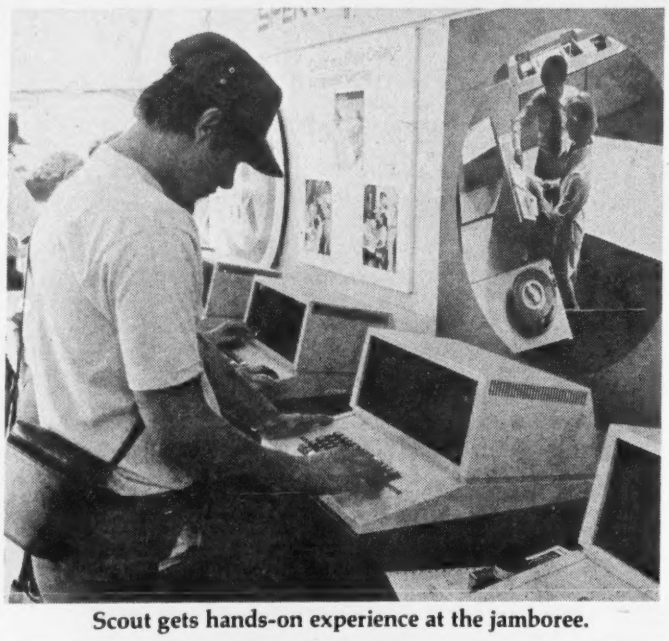
Sponsored jointly with California State College, which offered a $1,000 scholarship to the scout who proved himself most adept at modern problem solving, the Univac exhibit gave scouts the opportunity for hands-on interaction with a computer and a chance to qualify for merit badges.

Nine CRT screens in the Merit Badge Midway at the Jamboree were programmed to ask questions; the scouts responded with information about themselves and their planned activities. One screen provided a continuous calendar of Jamboree events.

Overall response was very good, according to a Univac representative, who said long lines formed to enter the exhibit. The scouts participating in the computer exhibit received credit toward a merit badge in computer science as well as the special Jamboree merit badge offered by California State College.

Setting up an operational computer system in a tent posed some technological problems for Univac representatives, according to C.H. Riley of Univac's Pittsburgh office.

To provide the necessary temperature controls, the computer was housed in an air-conditioned van parked near the midway and connected by cable with the CRT screens. Computer fans were able to tour the van.



Scout gets hands-on experience at the jamboree.

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NEW YORK — Structured Methods, Inc. will offer courses on "Infotech/Jackson Design Technology," "Data Base and the Organization" and "Data Base Package Analysis and Selection" in several cities in the near future.

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"Data Base and the Organization," aimed at management and senior technical professionals, will be conducted Dec. 5-7 in Chicago, Jan. 16-18 in San Francisco and Feb. 13-15 in Washington, D.C.

"Data Base Package Analysis and Selection" will be held Dec. 7-9 in San Francisco, Jan. 9-11 in Chicago, Jan. 23-25 in Washington, D.C., and Feb. 13-15 in Toronto.

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Brochure Provides Checklist

System Conversion Woes Can Be Eased: GAO

WASHINGTON, D.C. — The problems involved in modifying programs from other DP sites as well as converting to an entirely new CPU can be eased in a number of ways, according to a report from the U.S. General Accounting Office (GAO).

In a brochure entitled "Provisional Checklist for Software Conversion Projects," the GAO outlines questions that should be asked and answered prior to undertaking the conversion effort. The report also lists steps to take during planning, execution and followup of the project. The GAO prepared the brochure in conjunction with its report to Congress entitled "Millions in Savings Possible in Converting Programs from One Computer to Another" [CW, Oct. 24].

At the outset, an installation should decide when the applications must be in production on the new system and whether work will be done by in-house staff, staff from other agencies or contractors.

Contracting can be attractive if skilled specialists will convert the software for a fixed price, the report observed.

Managers should also examine their software inventory and determine what can be thrown away and whether some software would be less trouble to write new than to convert.

In addition, they should look at the expected useful life of the old software. For instance, emulation might be a satisfactory answer if long use is not anticipated.

Looking at data and files inventory, the manager should determine what can be thrown away, what incompatibilities exist between the old and new systems' file handling capabilities and whether bridging software needs to be written to automate the conversion.

A detailed inventory of software files and documentation to be converted should be prepared, the report indicated.

Also, managers should look at alternatives to conversion, such as obtaining usable existing programs for the new system and/or rewriting the old software. "The old software may be so bad that it should be thrown away and completely new applications written for the new system," the report continued.

The next step is to plan the project.

Select a contractor experienced in conversion who will quote a fixed price and include lateness penalties and acceptance testing, the GAO said.

Look at the timing of the effort and determine if some useful preconversion can be done, the report said.

Another factor to consider is resource availability.

When assigning staff, the GAO recommends that team members be on the project full time.

The GAO recommends learning what automated conversion aids are available.

The planning phase should include an attempt to capture all possible information such as that from memories of project originators.

Execution Phase

The execution phase of the project should also include information capture and preparation of a schedule with definable milestones.

All the programs to be converted should be packaged with pertinent material.

The conversion effort should not involve redesign, according to the GAO.

Conversion should include documentation as an ongoing task. If possible, documentation should be captured in a machine-readable medium.

Last but not least, each program must be tested before it is released to production.

After the converted items are in production, the installation should immediately finish the documentation, the GAO said. It should keep results of test runs and ideas for future improvements.

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SEE PAGE 3.

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***Stephen L. Robinson**, who regularly writes the "Data base Corner" for Computerworld, has been affiliated with Performance Development Corporation (where he was Director of Professional Development), and CACI (where he provided educational and consulting services for data base projects). He has also lectured on data base for AMR International, the American Management Association, ACM and DPMA.*

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***Arnold Schron** has served a large, multi-divisional company in various technical and management positions including Manager, Data base Administration; and Manager, Marketing Information Systems. He was responsible for the application of analytical techniques to information data bases for marketing. Mr. Schron lectures on data base in the Computer Application Information Systems Department at the New York University Graduate School of Business.*

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Editorial

Time to Face Reality

Little talk is being heard these days about a total rewrite of the 1934 Communications Act. Instead, members of the House Subcommittee on Communications seem to be concentrating on the primary instrument concept, which would require that the first telephone or other carrier device at a user site be supplied by the local telephone company.

The primary instrument concept is not new. It was proposed some time ago by the telephone companies as an alternative to the connecting arrangements.

Only after the Supreme Court refused to consider the Federal Communications Commission (FCC) ruling on certification and registration of customer-provided equipment did Bell change its footwork to try to salvage something out of the interconnection squabble.

Giving Bell the toehold of one telephone at a location in order to preserve some of its revenue and control over its own facilities is not necessarily wrong. It may, in fact, be a beneficial solution to at least one portion of the interconnetion controversy.

But, in a larger sense, the user needs to know what will happen to the rights of those with customer-provided equipment. It appears that the Supreme Court decision not to get involved with the FCC registration situation has also taken away some of the impetus from AT&T's push for the Consumer Communications Reform Act.

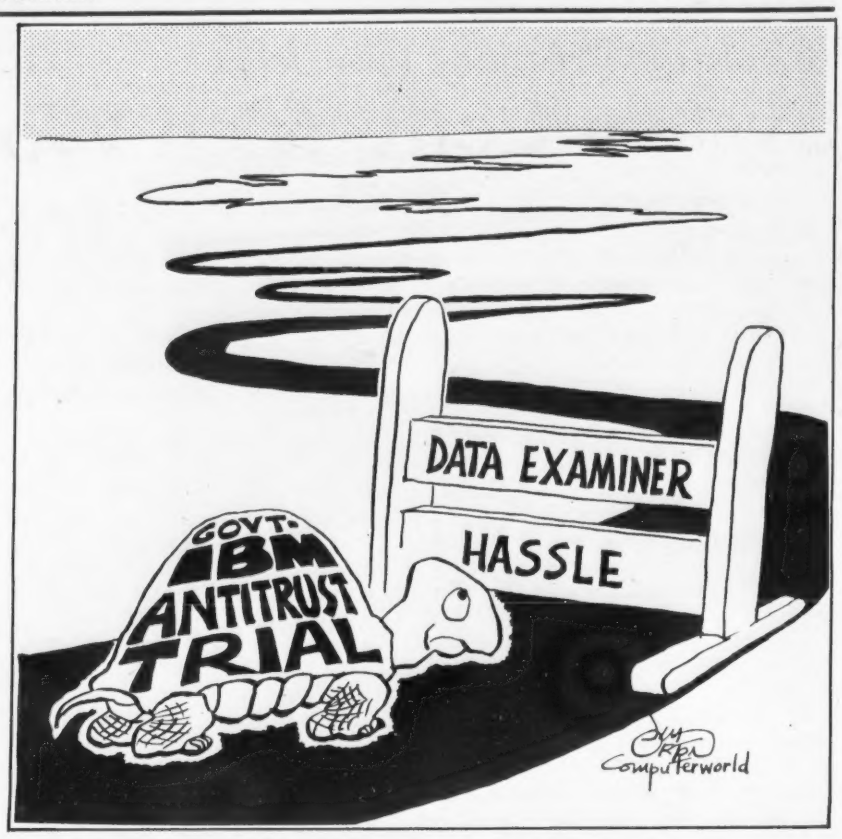
The House subcommittee should decide whether it wants to make communications and economics history with a Communications Act Rewrite or whether it wants to let the FCC go about its business of regulating the telecommunications carriers.

It may be that the congressmen have come to realize that there are very few votes directly connected with the issues raised by the Reform Act. The public at large cannot easily identify with a misnamed "consumer" bill that actually addresses the future of an important new industry.

Business telecommunications users have a vital stake in this controversy. They may not carry much political clout in the form of votes, but the companies they represent form the backbone of the gross national product.

Bell has lost the interconnection battle. More and more users have been enjoying the monetary and operational benefits associated with using noncarrier devices. It is too late for either the telephone company or Congress to stem this tide.

It is time that both organizations face reality and turn their attention to more reasonable pursuits.



Data Past

Five Years Ago
Nov. 15, 1972

OAKLAND, Calif. — Hugh Jeffrey Ward pleaded guilty to a felony charge of stealing trade secrets after he was charged with tapping a time-sharing computer and stealing a program. Ward's employer, University Computing Co. (UCC) had been fined $300,000 in a civil trial in which UCC claimed the program was not a trade secret because its code was printed in a newsletter by Information Systems Design, Inc., plaintiff in the case and a competitor of UCC.

— — —

Computer-based voting systems proved successful for the most part in the previous week's national election. But even though most systems appeared to work up to or beyond expectations, there were few isolated cases where dampness slowed the card count and at least one case where it appeared that voters intentionally tried to "foul up" the system.

Eight Years Ago
Nov. 19, 1969

LOS ANGELES — IBM's Votomatic system was attacked at hearings conducted by the Los Angeles Elections Security Committee here. A witness who investigated the system testified that IBM knew its vote-counting system was not tamperproof and that the protective test "did not do the full job." The witness asked that use of the system be suspended.

— — —

PARAMUS', N.J. — Decision Systems, Inc. (DSI) announced a Cobol compiler for the IBM 360/20 that required only 8K of memory and had capabilities similar to those of Honeywell's Cobol B. Claimed to be completely compatible with other 360 Cobol compilers, the DSI Cobol operated under the Tape Programming System.

Letters to the Editor

Word of Encouragement

The "Apples and Oranges" editorial [CW, Oct. 24] touched upon a very frustrating problem, relating one line of computers to another. As was pointed out, this is difficult enough within one manufacturer's family. Crossing brand name boundaries is unreal.

I am far from sure that it is feasible to combine in one measurement both performance attributes that can now be measured by millions of instructions per second (Mips) and other attributes that can now be measured by throughput. However, I think it is desirable to try.

I encourage *Computerworld* to carry out the proposal stated in the closing paragraphs of the editorial. Good luck in your quest for a universally acceptable measure for computer system performance.

H.S. Beers Jr.
New York, N.Y.

What Could Be Simpler?

Concerning the editorial "Apples and Oranges" [CW, Oct. 24], the answer is software physics.

K.L. Kashmarek
Moline, Ill.

DP Managers Not All-Knowing

I am writing in response to "DP Departments Urged to Tell — Not Ask — Users What They Need," [CW, Oct. 24].

Joseph J. Carr's premise that DP departments should tell the user what he needs rather than ask him what he wants seems to me to be a giant step backward. For several years, there has been a concerted effort in most DP shops toward becoming responsive to the end user.

To presume that a DP manager knows as much about the user's particular business and problems as the user does may be a serious mistake. A DP manager who possesses that level of knowledge is indeed rare.

I think Carr's efforts to bring line managers into the ranks of computer professionals are a step in the right direction, as he may get user-oriented DPers as a result. Computer people need to be businessmen.

I also agree with Carr's goal of channeling DP effort toward those tasks that meet corporate goals. I'm not sure how he has become more knowledgeable in the area of corporate objectives than the user managers, but I suppose in so doing he has precluded the need for a steering committee.

I may have taken Carr's remarks out of context, as I did not attend the session. If so, I apologize.

However, I do feel strongly that, in the end, the user must identify his needs and DP should respond to those needs.

James J. Nunnally
Denver, Colo.

Cross-References, Please

The article "Data Base Provides Business Model" by Frank A. Dottore [CW, Oct. 31] was very interesting. However, the article bears a striking similarity to a portion of the article "What Data Base Isn't" by Daniel S. Appleton, which appeared in *Datamation* in January 1977.

In future editions, CW should cross-reference related, previously published materials.

Dennis J. Broderick
Buffalo Grove, Ill.

Dottore acknowledges that others may have published thoughts similar to his, but he was unaware of Appleton's article. The ideas in the CW article are a distillation of an article Dottore wrote in 1973 after a data base study at Xerox. That article was published in a Xerox technical newsletter then. Ed.

Readers Disagree on Degree Requirement

By Jack Stone
Special to CW

Regina Litman's letter in this column [CW, July 4] triggered quite a response from the readership. This and the subsequent column complete the four-part series on the issue of college degree requirements for data processing personnel. I'll present reader opinions; both pro and con, in each article.

Steve Turek, a programmer/analyst with the Kansas City, Mo., municipal court, claimed that the ability to learn is a characteristic of the DP job and the degree tends to establish the existence of that ability. He writes: "DP is an ever-changing field. Therefore, it would be good to hire people who can learn to do things in a different way. It is true a college degree will not guarantee an employer that the person hired will do a satisfactory job. However, if the job will require learning new concepts, then a college degree might increase the company's chances of choosing the right person."

Morgan Huff, vice-president and manager of the electronics department of Life and Casualty Insurance Co., said degreed people simply do better. "Why is it that people like Litman always cry bias and discrimination when others (people with degrees) get better positions than they? . . . People with degrees are usually better performers and thus are rewarded better . . . It's because these people have proven two things; they were willing to devote at least four years . . . trying to improve themselves and they had the intelligence to pass the minimum requirements for such a degree."

Anthony Mustapich, DP director for Mountain States Bankcard Association, said that the degree is desirable but not requisite. "A degree . . . should be no more than a 'preferred' element for certain entry-level positions. Degrees in other than business . . . or computer science would have even further limited value, as would a graduate degree. In hiring for positions other than entry level, work experience, job performance and aptitude for the higher level are what counts. My present staff (including management) is a mixed bag educationally. Most have at least some college-level credit, and the modal level is an associate degree. The key is that their performance on the job is not directly tied to formal education."

James Ward, manager of systems for a midwest firm, expressing the viewpoint of an employer, said he differentiates in his recruitment policies for programmers and analysts. He stated: "The decision to hire is always a risky one . . . I was once told that a person should never hire someone until after they've worked together for two years.

"With the exception of the point about the Certificate in Data Processing, all possible explanations mentioned (by Litman) for employer's preference for degreed individuals may have some validity. The fact is that there are always many applicants for any open position and the degree gives an employer some means of discriminating . . .

The Human Connection

"I personally do not recruit entry-level programmers. Once a person has some work experience, he or she can be evaluated on the basis of their work product and capabilities. A degree in this case is not particularly relevant.

"I do, however, hire entry-level systems analysts. I am concerned with recruiting individuals who have well-developed interpersonal skills and business acumen . . . I feel that I am much more likely to find these skills among degreed individuals and, in fact, seek out people with advanced degrees . . .

"All other things being equal (which they never really are), superior educational credentials will always give a person an edge in both hiring and advancement . . . My advice to those who feel they are being held back through lack of a degree is to stop griping and go back to school. I know it's possible because I did it and now have two degrees to show for my efforts.

"One reason for not going back to school is that once they have obtained a degree, some people may have to find other reasons to explain their lack of professional advancement."

Finally, here is the viewpoint of a nondegreed operations manager who feels he is "dead-ended" without a college diploma. He complains that " . . . At the time of my last review, I was told I should not expect any further advancement unless I had a college degree. This made me stop and evaluate the situation. I am in my late thirties, a high school graduate, . . . and have been in DP for eight years, mostly in a supervisory or managerial capacity. I am self-taught in computer operations and programming.

"If I were to enroll in a degree program, it would take me seven to 10 years to obtain a B.A. degree. This is a long time to be "unpromotable," and because my employer is a progressive company, it could very well decide to replace me with someone more "promotable." That would put me up the proverbial creek.

Letters to Stone should be addressed to him at 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Classifying Errors Can Ease Understanding

The Taylor Report
By Alan Taylor CDP

The complaint logs maintained on a typical data processing system are not particularly intelligible to outsiders — and you don't have to go far outside before someone becomes an "outsider" in this instance. Consider, for example, how often even the project manager has difficulty in understanding the situation shown by a well-kept set of error logs.

There has been very little work done on handling this aspect of computers, yet what seems to be needed is a clear and generally understood language regarding errors that would form a framework to facilitate understanding.

There seem to be only a few basic types of error produced by systems, so a common language is certainly possible. The two basic errors concern inaccuracy and unsuitability. A report may have a perfectly accurate entry, but for one reason or another it can be unsuitable for the system's users. And that is as much an error as adding two and two incorrectly.

For instance, if the purpose of the system is to locate service facilities to handle a crisis within one hour and the output shows a service facility that cannot be reached for six hours, then it is simply unsuited for the purpose.

A result might also be unsuitable if following the result can only lead to correct operations if different working methods are involved, or if differently trained people use the system, or when the ability to compare the meaning of today's output with previous history is impaired by the way the output is produced.

Probably these types of errors are more frequent than errors of inaccuracy.

In the same way that there are various types of unsuitability errors, there are also types of inaccuracy errors. An entry may simply be wrong, such as a town's name appearing where a balance forward should appear. It may be incomplete, such as a monthly statement that doesn't have all the entries on it. Or, it simply may be absent altogether.

A particular case of the "absent" type of inaccurate error is where the report concerned is late. Even though it turns up eventually, at the time it should have been present it was not.

Using this simple classification can help focus people's attention on both where something is in error and what alternative steps can be taken to handle the situation. (It does *not* deal with how the situation arose).

For instance, an error report saying that wrong information from a data base was given out on an inquiry for John Jones of 360 Roslyndale Blvd. when in fact there are two such people clearly falls into the "inaccurate" column so far as error analysis is concerned.

If inaccurate results occur — say a service call is sent to the incorrect address — the responsibility for producing accurate output must rest with the programmers and systems people. If, however, the information is erroneous through unsuitability, users must also be involved in considering whether to change the program, training, manuals or personnel using the system — or abandon the system altogether.

The problem of "false" errors — errors that are possibly not errors at all — has to be considered in any error logs. One philosophy is that there is no such thing as a "false" error, the output may be correct and as expected, but if it causes even a claim of error, then that is a problem.

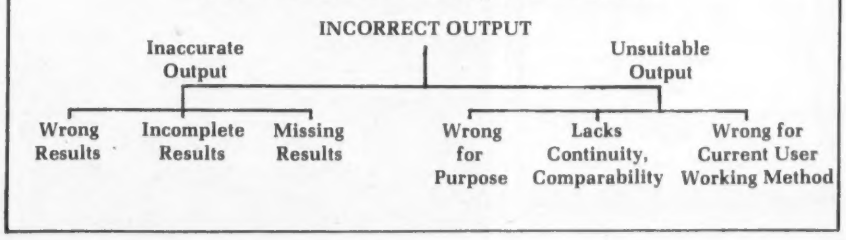
Another approach is to refuse to consider anything as an error until it can be shown in black and white that everything else was handled with inhuman perfection, and still something went wrong.

I don't think that either of these attitudes is good, but what really matters is consistency in the log. A possible middle ground is for it to include all claimed errors and to have a "reasonable investigation period" — say one week — for anyone to show that no error occurred. If someone does, the item is backed out into the unjustified complaint area. Really, each installation is on its own here.

We should adopt clean, common definitions of errors, keep track of them and watch the efficiency of methods used to reduce them. A few months or years of this tracked against system usage will give an understanding of the operational characteristics and safety quality of the system to anyone from chairman of the board to detailed maintenance programmer, and that is the type of common understanding we sorely need.

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The Families of Computer Errors



Pompous Verbiage Clouds a Good Thesis...

Reader Commentary

By George J. Lehman
Special to CW

Frank Binder's castigation of education in general, and DP education in particular ["DP Education Worthless in Everyday Use," CW, Oct. 3] was a marked departure from the jargon and Spartan prose normally encountered in your publication.

Grandiloquence, however, can never be a substitute for clarity of thought.

Binder's jeremiad — crafted in three languages none currently used — did little to raise the literary level of technical writing but much to qualify him for the honorific "The Mister Malaprop of Data Processing."

Extreme caution should be used when employing phrases like "semiliterate twit," especially when the same writer spews forth words like "paleantology" (sic) and phrases such as "a duumvirate of perdition." "Duumvirate" means the rule by two men: When Anthony and Octavian retired Lepidus, they transformed the Triumvirate into the Duumvirate.

Mixed Metaphor

Binder's misuse of the word qualifies him to place the three initials, MMM, after his name. In this instance they stand for "Master of the Mixed Metaphor." Semiliterate twit is not, perforce, limited to the third person.

Binder's mirth-heaving shoulders, one assumes, would have commenced to droop had he paid closer attention to the German exchanged between Explorer I and Sputnik: the German world for "we" is "wir," not "wier." They would have collapsed in total chagrin when a whippet of a first-semester Latin student pointed out that the plural of "deus ex machina" is "dei ex machinis," not his proffered (and totally erroneous) "deii ex machinae."

Classical education received in Europe? To paraphrase his colleague from Alabama, "Yuh can matriculate a muskrat at Goettingen, but that doan make him a polymath."

Act of Contrition

As an act of contrition, I suggest that Binder find some quiet corner at Air New England and there, like the errant Charles Bovary, devote himself to the conjugation of *ridiculous sum*. In penance, he can for three days personally debug all the core-dumps in his installation.

Admittedly, that is severe for a director of DP; however, if a Hohenstauffen emperor could be made to stand barefoot in the snow of Canossa for the same period of time, a truely [sic] contrite director can return to the cybernetic hog-slopping of "base plus displacement."

The unfortunate result of

(Continued on Page 23)



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...But 'Speech Surgery' Stunts Imagination

By Frank K. Binder
Special to CW

I have several points to make regarding George Lehmann's critique of my Oct. 3 contribution to Computerwold.

First, I listened very closely to Sputnik's conversation with Explorer I, that's how I found out that Sputnik had a very heavy Russian accent. Hence the "wier" instead of "wir."

Second, 'Duumvirate" imaginatively translated is a rule of two, thus is rather properly used when emphasizing only two possibilities. This is certainly much more acurate than the constant improper use of the world "consensus."

Finally, I knew 38 years ago, when I was a whippet of a first-semester Latin student, and I still know today that it is "ex machinis." Had I any doubt, the often-used "ex libris" would have been a sufficient reminder. The "ex machinae" was a direct quote from an interview with a CPA and self-ordained DP expert. My secretary omitted the quotes.

She also misspelled "paleontology," hardly worse than spelling "truly" as "truely."

Reader Commentary

The editors of *Computerworld* also changed my 'modus bibendi' to 'modus vivendi.' It somewhat defanged my intended satiric flavor, yet it has never been my intention to shoot a horse because of an occasional stumble.

I'm glad Lehmann and I agree in principle. As for an over pedantic approach to languages, speech surgery only stunts the imagination.

Binder is director of data processing for Air New England in Boston, Mass.

Clouds Hide Good Thesis On Learning

(Continued from Page 22)

Binder's pomposity is that it obscures the validity of his premise: Education is generally abysmal, and DP education generally worthless. Had he concentrated upon those themes, he would have performed a valuable service.

As it was, however, he merely used them to flaunt his stilted prose and wallow in rhetorical puffery. How unfortunate! In his attempt to show us everything he knew, he showed too much: He demonstrated how superficial was much of his erudition.

In Words of St. Jerome

There is a point of balance, and it is to be hoped that in the future Binder might hearken unto the words of St. Jerome: "*Sicut enim a perfecta scientia procul sumus, levioris culpae arbitramur saltem parum, quam omnio nihil dicere.*" (Remote as we are from perfect knowledge, we deem it better to say too little rather than nothing at all.).

Lehmann is a DP consultant in private practice in Hollywood, Calif.

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That Comes in the Field

Teaching DP Nitty-Gritty Not Colleges' Job

By Temple S. Robinson
Special to CW

A recent *Computerworld* article that deplored the college-educated DPer was written as though every college student should be educated in the nitty-gritty of everyday operation.

This is not the purpose of a good university. The university teaches the language of the areas in which a student majors. In addition, it introduces him to the arts and languages of the world, showing him how to access the collected knowledge of the world.

When one takes a course in something with which he is familiar in a practicable way, it often seems the school is stupid. This is understandable, if one is familiar with the time span needed to gather knowledge, publish it and get it accepted by the academics. In a fast-moving technology that makes quantum leaps in a decade, it is impossible for the book cycle to keep up.

No university guarantees its graduates are the ultimate, nor should it. A lot of dedicated professors and scholars are trying to impart some of their accumulated knowledge to every student that comes under their wings.

Certain students always stand out in any discipline. This does not mean the others do not profit by it.

Not Trade Schools

There are some that would have our universities become trade schools. Please protect us from that. It is only the well-rounded person with a trained mind who contributes to the progress of technology and the world.

Some people can do this without the university — but not many.

The university, insisting on a broad spectrum, can turn out persons able to handle any job, with little additional training in the nitty-gritty. Expertise in a given technique should be acquired in the field.

The person with a university background is the one who can most easily understand the social impact of a new technology. The technicians usually have the feeling that their inside knowledge makes them the only arbiters of their trade.

Need for Compromise

The well-rounded person is aware of the compromises needed to interface the technology with the rest of the world.

It is the technician who wants to "reinvent the wheel" every time. He usually puts job insurance ahead of progress.

The university-trained person sees the need for common software and a systems approach to the job.

Buzzwords are bandied about on any job, where the "new boy" is trying to establish himself in a new environment. He uses this to boost his ego and overcome the cutting-down process of the technician, who feels superior because of his inside knowledge of a given operation.

The university is not blameless. It has to grab a new technology and build a curriculum to meet student demand. It has its failures, but is usually flexible enough to introduce change as needed.

It is almost impossible to get a person at the forefront of a technology to return to the classroom and teach. (Also, he usually is not a capable teacher.) It is therefore necessary for the staff to learn new skills and a new body of knowledge in a very short time.

I believe it is a duty of those of us who return for refresher courses to help the teacher with our knowlege, not to sharpshoot or deprecate the teacher because we happen to be knowledgeable in a given area.

To make the university really great, we should have people returning, at all times, for retraining. These people should be imparting their more current knowledge to the teachers.

In this way we can beat the book cycle and input knowledge more rapidly into the classroom.

One must not overlook the contribution of the language, linguistic and mathematics teachers (and writers) to the advancement of DP. It is their research and writing that has rapidly spread the word.

These dedicated people are the ones who should be praised, not damned, by the technicians.

Robinson, an airline pilot by profession, became interested in computers while assigned to a project on cockpit navigation. He now holds an associate degree in DP and is working toward a B.A., majoring in administrative computer science and minoring in accounting.

Reader Commentary

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DP's Position in Corporate Structure Shifted

By T.J. VanderNoot
And Rachel Bedford
Special to CW

A persistent theme in the literature of the data processing field is the ideal organization of the DP function internally — what structures are necessary or desirable for a DP department to perform its functions — and, externally, how the DP department should relate to the rest of the company or institution.

In 1967, the Japanese Computer Usage Development Institute studied 157 Japanese and 250 U.S. firms. In 78% of the U.S. firms, computer facilities were assigned to financial operations and reported through that chain of command.

In contrast, only 18% of Japanese firms reported through financial management.

During the past 10 years, DP has tended to move out of finance and into a more centrally oriented position in the corporate structure. A recent survey conducted by Syracuse University's School of Management found the proportion of DP departments reporting to financial management down to 59%.

At the same time, the proportion of departments reporting either directly to the president or executive vice-president or with a vice-presidential officer in charge of the department has climbed to 27%.

A hypothesis was advanced after the 1967 survey to explain why many more computer facilities reported to financial officers in the U.S. than in Japan. It was pointed out that the U.S. has had a longer history of automation, particularly with respect to unit record gear.

Reader Commentary

When computers came along, they were viewed initially as very large, fast unit record devices and were, therefore, assigned to the financial area.

Japan, however, had no such history of unit record systems and as computers began to appear, there was no prima facie reason for assigning the computer operation to any existing function.

For the Syracuse University study, 300 firms were selected from *Fortune*'s lists of the largest firms and were sent a brief questionnaire. One indication of the importance many managers give to this subject is that 177 firms responded (59%), a very high response rate for mail surveys.

VanderNoot is president of Murray, VanderNoot & Associates Ltd. in Ottawa, management and DP consultants. Bedford worked with the firm as a graduate student.

Letters to The Editor

What Did He Say? Only Lord Knows

I await Kenniston W. Lord Jr.'s promised articles on licensing and hope they will somehow clarify the first one of his series [CW, Oct. 17]. In paragraph 6 he wrote: "I was convinced that there was a problem and that licensing was a means of addressing the problem."

Without further reference to or definition of the problem, he said in paragraph 16: "I shall present one plan for addressing the issue in its entirety." But in paragraphs 8 and 13 he introduced *two* specific issues, whose relation to each other and to the problem were not stated.

Perhaps Lord knows what he is talking about. I don't.

David Ames
Watertown, Mass.

End the Effluvium

Perhaps the time has arrived for Ken Lord to find a new topic of interest outside of licensing and certification and for *Computerworld* to cease soiling its pages with his effluvium.

It is evident that the big push for certification and/or licensing emanates not from the bosses who pay the salaries, but from the "rational people" (hucksters) who foresee profits in fees for the exams and profits in the phony tutoring schools.

Mort Burdman
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Bitslice and Waxworks Bring You

'Sounds of Computing' a Record for History

By Miles Benson
Special to CW

As the history of computing whips by at a nanosecond pace, few indeed are the computing buffs among us who can stand back, view that hectic pace dispassionately and contemplate recording the emergence of our new field for posterity.

The Sociology Of Computing

Think of it — a field born in the '50s, grown to maturity by the early '70s. That rapid growth must be documented in appropriate media before the memories of living through it slip away from us all.

It is in this spirit that the hypothetical record firm of Bitslice and Waxwords has brought out a new platter entitled "The Sounds of Computing." Destined to become a hit in computing circles, the record follows in the tradition of such other best sellers as "The Sounds of Sebring," "Steam Locomotives I Have Known and Loved" and "Exotic Bird Calls of Iran."

The opus is composed of three movements:

• *The 026 Keypunch:* — This is a real collector's item. The 029 may be newer, quieter and more efficient, but for sound buffs nothing can ever take the place of the old 026.

Listen as the 026 is switched on with a loud "click" at the beginning of an 8 a.m. shift and slowly accelerates into action under the practiced hands of a skilled keypunch person. The staccato rhythm builds to a climax at the 10:20 coffee break, then shatters as silence descends on the keypunch room.

At 10:30, listen carefully as the 026 begins punching Fortran source cards, then switches over to data input with a noticeable increase in punches per card and finally begins punching Cobol source with a nearly constant clatter of keys. Truly a nostalgic experience.

• *Pascal Time-Sharing Terminal:* — First time ever for this exciting new sound. Listen as the neophyte computer user sits down for his first time-sharing terminal session. At 1:05 into the session the system disconnects loudly because of a faulty charge number key-in.

Notice the striking similarity of the subsequent 1:05 to the preceding 1:05. A slow murmur of profanity precedes a new tempo as the system disconnects again and the terminal instructor takes over and keys in the proper sequence.

As the neophyte again takes over at 2:55, hear the interplay of the painfully slow user type-ins followed by rapid-fire system diagnostic responses.

What you are hearing is Pascal, a computer language especially well-suited to listening pleasure.

Notice at 5:17 as a faulty phone line causes a bad transmission and a resulting distorted rhythm of typing, followed by another system disconnect.

And in a strong climax, hear the excited talk of the user as he successfully receives the correct answer to his test program and types "BYE" in a thrilling intentional disconnect.

• *Checkout Session:* — Recorded on-the-spot during an all-night checkout session of a crash program. Excited voices and scratching pencils being applied to coding sheets make a cacaphony of sound to open the session. Hear first one, then another of the programmers spin off into wild improvisations on the basic theme of the program.

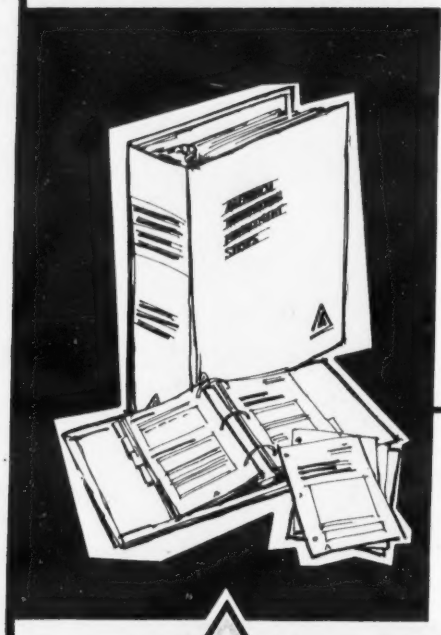
In a mounting frenzy, the program is readied for its first checkout run; time passes; we hear the programmers return, exhausted and discouraged, with the results of the first run.

Hear again the improvisations, each succeeding one growing less forceful as the programmer comes to realize that he, too, has not solved the problem.

And finally, in a beautiful tapering off of sound, the session lapses into three minutes of recorded silence punctuated only by occasional headscratching.

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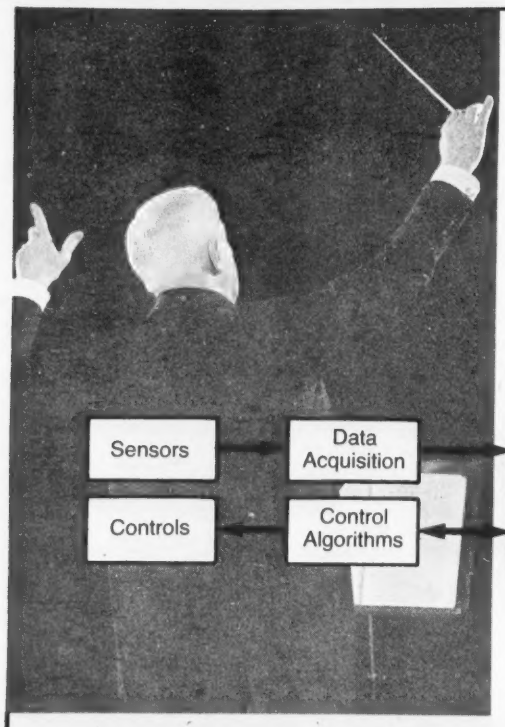
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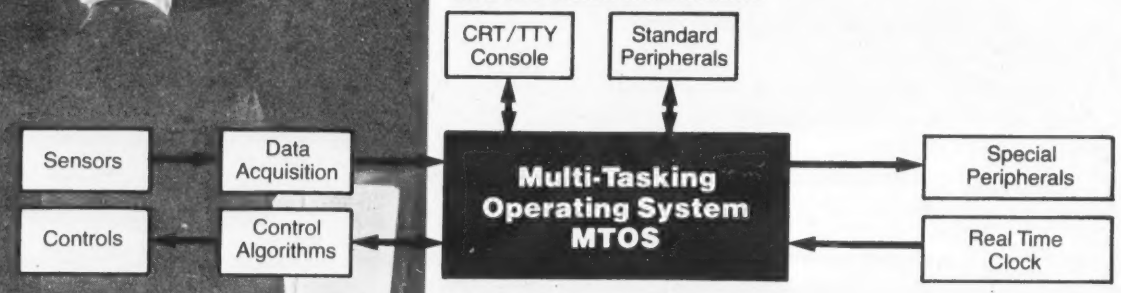
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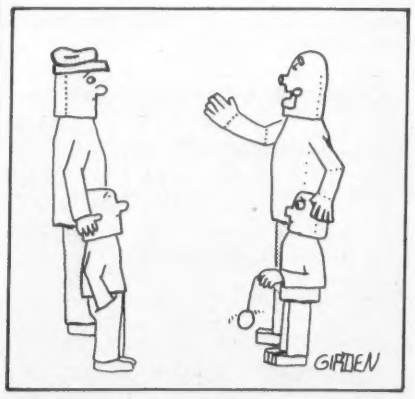


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Apply Yourself

Computerworld will publish a special report on application packages in January, and to make it as useful as possible we'd welcome articles contributed by users outlining their experiences with package acquisition and use.

Many installations don't know what benefits they should realistically expect to gain from packages, how they should check out what is available before they buy, what kinds of problems they may encounter in trying to install and what kind of help they might get from the vendors.

These are the points we'd like to cover. You can help with manuscripts limited to about 1,000 words (four typed, double-spaced pages). Please send them by Dec. 16 to Don Leavitt, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Package Designed to Tame Costs of Manufacturing

WOODLAND HILLS, Calif. — Costcontrol/80 has been developed to help IBM 360/70 installations in the manufacturing industry control investments in work-in-progress (WIP) and perpetual inventories, according to Informatics, Inc.

The system contains features for accumulation of actual and standard costs against work orders, WIP variance analysis, WIP and inventory valuation, labor distribution and purchase variance reporting.

Costcontrol/80 is the first product in a line of independent, functionally oriented software systems, Informatics said. The next one, according to the company's calculations, will be Shopfloorcontrol/80, intended to concentrate on work order release, scheduling and control.

Users were provided with insight into Shopfloorcontrol/80 last spring, however, when the Make Order Maintenance subsystem came out in May.

That phase of the whole operation will be joined by a WIP monitoring system, probably later this month, and by a package called shop paper generation and dispatching, expected to be issued shortly after the new year starts, a spokesman said.

Each of the software packages will integrate with Informatics' existing product line for manufacturers including, for example, Production IV.

The integration with existing environments — including data base management systems — has been made simpler, he said, by separating I/O operations into detachable subroutines.

Costcontrol/80, for DOS, OS and VS users, is written in ANS Cobol and will require 128K bytes in a DOS setting. It costs $25,000.

Shopfloorcontrol/80 will be in the $35,000 range, depending on the user's environment and subsystems selected, Informatics said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Forecasts to 1990

Service Shows Industry Trends

CAMBRIDGE, Mass. — The Economic Advisory Service (EAS), an industry analysis, forecasting and consulting service designed to assist business and financial executives and government policy makers, is now available on General Electric's Mark III remote computing network.

Developed by Arthur D. Little, Inc. (ADL), the service is said to be the largest on-line system commercially available today for evaluating interindustry relationships and for forecasting the outlook for key industry sectors.

Technological and regulatory changes anticipated by the developer's economists and other experts are built into the forecasts. The service pinpoints purchase-sale relationships among major industry sectors and its query capability allows users to evaluate the implications of the possible changes, an ADL spokesman noted.

EAS also provides forecasts to 1990 of the growth rates for more than 220 industry sectors of the U.S. economy, primarily at the four-digit "SIC" level of disaggregation. Forecasts of the dollar flows from each industry sector to over 250 final demand expenditure categories are also provided .

Hard-Copy Reports

Short-term and long-term forecasts of U.S. industrial performance are available to subscribers both on-line and in hard-copy form. The short-term views are updated quarterly, while the forecasts through 1990 are updated annually, GE said.

An annual subscription to EAS, in addition to the cost of resources utilized on the network, is priced at $15,000, payable to Arthur D. Little at Acorn Park, Cambridge, Mass. 02140.

GE's network, available internationally, is headquartered at 401 N. Washington St., Rockville, Md.

Lighter Micr Loads Handled

DALLAS — Banks and other financial institutions with check processing volumes that can be handled with a single magnetic ink character recognition (Micr) reader/-sorter are the expected users of the Super Micr-SS package introduced by University Computing Co. (UCC) for IBM DOS and DOS/VS shops.

Effectively an enhanced subset of the older Super Micr-One and Super Micr-Two packages which UCC produced for multibank, multibranch operations, Super Micr-SS is said to minimize main memory requirements while providing facilities that maximize resource utilization.

Using departments have capabilities to control the capture, distribution and reporting functions of the Micr system operation, according to a spokesman. With on-line reconciliation, rejects may be reentered and input transactions balanced before posting.

The disk-oriented Super Micr-SS supports both the IBM 1419 and the IBM 2956 Micr reader/sorters and requires "approximately 80K bytes" of main memory depending on the amount of custom coding.

The package costs $25,000 on a permanent license, but lease plans are also available, the spokesman said from 8303 Elmbrook Drive, Dallas, Texas 75247.

Extel Micro Gains Sales Accounting

LONDON — Computer Analysts and Programmers Ltd. (CAP) has developed a sales accounting package for users of the Exchange Telegraph Co. (Extel) floppy disk Micro-File microcomputer system, which is based on an Intel 8080.

The package includes invoice extension and printing as well as statement preparation, according to CAP.

Maintenance of a balance forward sales ledger, including aging of the accounts on the ledger and monitoring of their credit levels, is another function of the package.

The sales accounting system requires an Extel Micro-File with 40,000 characters of storage, two disk drives with 300,000 characters each and a CRT-based terminal.

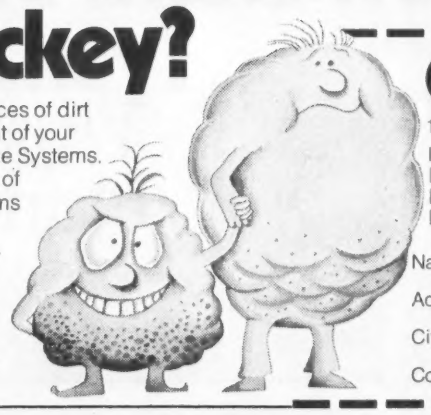
The equipment and standard software, including a Basic interpreter, is marketed by Extel and costs about $14,440. The sales accounting software alone costs about $1,805.

CAP is at CAP House, 14-15 Great James St., London WC1, England. Exchange Telegraph Co. is at Extel House, E. Harding St., London EC4 4HB, England.

Has it really been two whole weeks since you got caught with a hickey?

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UCLA Adds To 'BMDP'

LOS ANGELES — An expanded packaging of Fortran statistical programs that have been generalized beyond their origins in biomedical data processing, BMDP-77 is available from the University of California at Los Angeles (UCLA).

At the same time, a revised manual-from the University of California Press — includes descriptions of seven programs that have been added to the earlier BMDP packaging. This book is available separately and might be a useful way for potential users to study the package, a spokesman suggested.

Life Tables and All

The new programs focus on life tables; derivative-free nonlinear regression; general (unbalanced) mixed-model Anova; log-linear analysis of multiway tables; missing data estimation by regression; Furnival-Wilson (all possible subsets) regression; and quasi-independent models of two-way frequency tables, he explained.

Since all the programs in the package are written in Fortran, they can be run on many different CPUs. In an IBM OS environment using overlays, the programs require 160K bytes, the spokesman said.

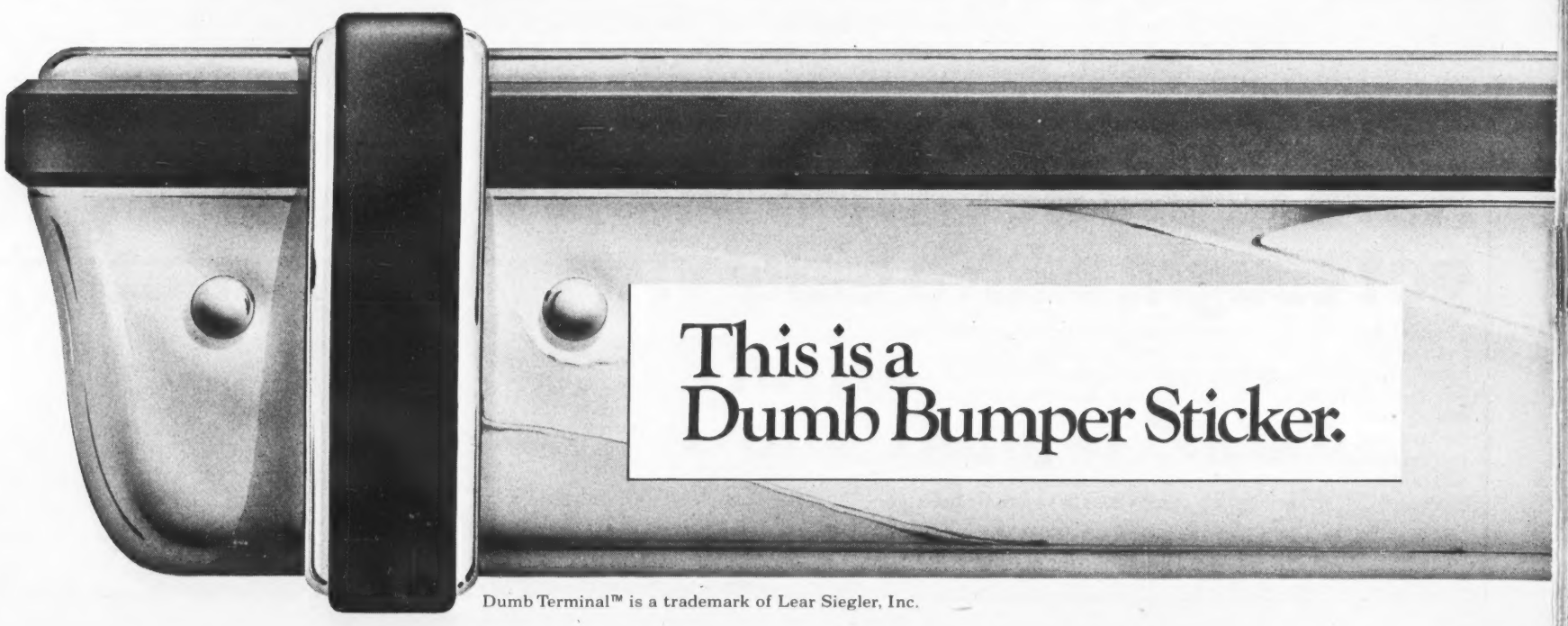
The programs cost $1,500 — with discounts available to government units, nonprofit organizations and universities — from the Health Sciences Computing Facility, UCLA, Los Angeles, Calif. 90024.

The manual costs $11.50 and can be ordered from the University of California Press, 2223 Fulton St., Berkeley, Calif. 94720.

Correction

In "Software Scene 'Diseased' But No Cures Near: King" [CW, Oct. 10], a sentence was omitted that noted David King was echoing ideas and phrases originally voiced by English consultant Michael Jackson at an Infotech conference in London in February.

King acknowledged his debt to Jackson and said his mentor's text will soon be available in Infotech's "State of the Art Report on Reliable Software."



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General Ledger System Gains On-Line Option

ANDOVER, Mass. — Software International has developed an on-line support package for use with its General Ledger and Financial Reporting System. The enhancement operates in DOS or OS environments under IBM's CICS, the vendor noted.

The support includes on-line editing of journal entries and adjustments. A generalized data entry utility allows the user to define screen formats for the IBM 3270 or any plug-compatible CRT terminal, according to a spokesman.

Since batch balancing is performed at the time of data entry, the problem of rejections occurring at posting time has effectively been eliminated, the spokesman stated.

Inquiring into any account to find such things as the balance at the last posting is another facility now available. In similar fashion, retrieval operations allow users to review the way accounts are related to one another or the formulas used to apportion charges, revenues and expenses, he said.

The basic general ledger system is said to handle any account numbering system so the user's accounting department can establish its own pyramid of accounts and alter the organization as it deems necessary.

The system can handle complex consolidations of subsidiaries with unlike charts of accounts that even include currency conversions.

The general ledger and financial reporting system costs $25,000 to $46,500 depending on features selected. The on-line capability is an additional $7,500 for DOS users or $8,500 for OS shops.

CICS has to be acquired by the user, Software International noted from Elm Sq., Andover, Mass. 01810.

Preparation of CRT Screens Eased by 'Deft' Software

JACKSONVILLE, Fla. — Screen programs for IBM 3277-type terminals can be written in high-level languages without dropping into macro-type facilities with the Display Entry Formatting Under TSO (Deft/3277) package now available from Generic Systems, Inc. (GSI).

Key to the support is a screen librarian which allows the user to create a format on a 3277 under a regular TSO user log-on, a GSI spokesman said.

The formats are created, modified and deleted independently of the application programs that use them, he added, explaining that the formats, once created, are stored in a library to be accessed by callable subroutines provided with the package.

These subroutines are called by the user's program to combine variable data with the format and to decode data typed in at the screen.

One advantage of this system, according to the spokesman, is that the analyst or programmer can create the format on the screen well in advance of developing the program to use it. The format can be viewed, and possibly revised, by the user as part of the system design phase.

Revisions can be studied almost immediately since their generation does not entail a program compilation.

While Deft/3277 is essentially the TSO environment, an additional set of subprograms is available to operate full-screen programs under a Tcam message handler, GSI noted.

The package costs $2,000 and can be ordered from GSI at 4251 University Blvd. South, Jacksonville, Fla. 32216.

Univac 1100 Cobol Tested

SPRINGFIELD, Va. — A summary report on how well a Univac 1100 series Cobol compiler stood up to government evaluation is now available from the National Technical Information Service (NTIS).

The validation runs were conducted by the Federal Cobol Compiler Testing Service to see how closely Univac's Ascii/Ansi Cobol Compiler Level 4R1 (Exec-8 Version 33R2) met the high-level implementation requirements defined in Federal Information Processing Standards Publication 21-1.

These requirements are based on ANS Cobol '74 and the validation summary report (VSR) on the tests is made up of several sections showing discrepancies found, NTIS explained.

The first section is an overview of the validation that lists all categories of discrepancies that might be found.

The final part of the VSR is a detailed listing of discrepancies together with the tests that were failed.

Although listed by the testing service as CCVS74-VSR-230, the report is cataloged by NTIS as AD-A042 837/5WC. It is "published" on microfiche only and costs $3 from NTIS at 5285 Port Royal Road, Springfield, Va. 22161.

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CPU capacity may be getting cheaper, but computer supplies certainly aren't. Our example is true. An 1100 LPM printer running at full capacity will put out some 700,000 pages per month, at a cost of five to ten thousand dollars! (Small wonder that the charges for paper are often the biggest "surprise" in your DP budget.) The need for protecting your DP investment — often at considerable expense — has also increased. And that's why we've devoted our December 26th/January 2nd special report to the many ways to stretch your supply dollars, and safeguard your computer system.

Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
- An overview of DP media — what to look for, how to get it
- Pooling resources — how four companies share quantity discounts

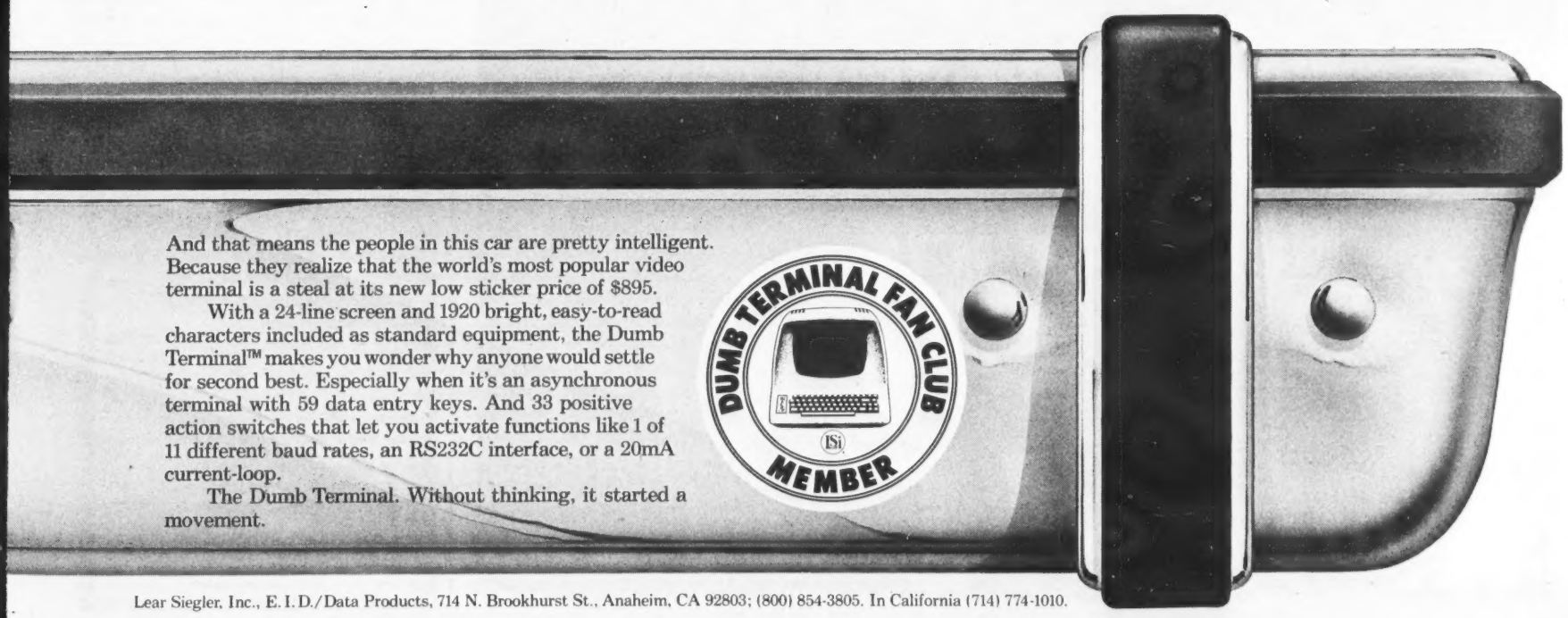
We'll also look at the practical aspects of computer security in this report, with articles like these:

- Effective contingency planning — targeting danger areas
- Computer crimes and disasters — how to cut losses and minimize risk

If you're a DP Manager, MIS Director or Corporate Executive with responsibility for DP cost control and security, be sure to read the special report in our year-end combined issue. And if you market products or services that cut the cost of computing, or safeguard what's in the computer room — advertise in this report. Ad closing date is December 9. For details, call your Computerworld salesman. To reserve your ad space, call Terry Williams at (617) 965-5800.

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Dictionary 'Cornerstone' of Data Management

By Henry C. Lefkovits
Special to CW

Professor E. H. Sibley stated in the foreward to the book *Data Dictionary Systems* (written by this author and published by Q.E.D. Information Sciences, Inc., Wellesley, Mass.) ". . . it is my contention, backed up by sad experience and horror stories, that the data base management system user needs a dictionary more than the data base system. All too many industrial (and governmental) users have found that their data base system was relatively useless until they implemented a good dictionary system: thus I label the data dictionary the cornerstone of good data management."

Experiences of the last few years support this theory and have demonstrated a clear trend in the availability of sophisticated data dictionary systems, as well as the ability of some users of these systems to derive substantial benefits from them. In a great majority of cases the use of a data dictionary system arose almost as a by-product of the use of a DBMS, and many users of DBMSs are beginning to find out that a data dictionary system is a prerequisite for the proper use of their DBMS.

Before discussing the uses of a data dictionary system, it is appropriate to present a definition. A data dictionary system is an information system in its own right containing information about an organization's data base. Given a data item, the data dictionary will contain information about its attributes and usage. It will not contain its value. This simplified definition will suffice for this article.

All Data Management

There is no reason why the use of a data dictionary system should be restricted to the environment of a DBMS. For data stored in conventional files the use of a dictionary system can be even more important. These files very often date back to the time when data, and the management of this data, was relegated solely to the discretion of programmers.

The proper use of a data dictionary system allows for the establishment of an inventory of all such data and its associated usage. It enables an assessment of the current state of the data and the existing degree of redundancy.

The net effect of such an effort not only generally results in the reduction of costs associated with the management of the data, but more importantly provides a significant improvement in the quality of the data. It is then that the true benefits of better decision-making can be realized.

The preceding uses of a data dictionary system are facets of the management of the data resource of the corporation, an activity called data administration. The basic rationale for this activity is the recognition that data represents an important and valuable asset of the enterprise and that it should be managed and controlled as carefully as other resources and assets are handled.

The domain of data so treated is not restricted to data that exists in a machine-processable form: the full concept of data administration is concerned with the entirety of the data regardless of the medium on which it resides. This task is similar, though more extensive, than what the Ansi/Sparc report calls building the conceptual schema of the enterprise. It is more general since it also includes identifying all the processes that interact with the entities in the conceptual schema.

Clearly Complex

The complexity of this task is clearly substantial and a data dictionary system can be used as the basic tool with which the conceptual schema can be stored and manipulated. Clearly, care must be given to the choice of the proper data model and the manner in which this model will be handled by the dictionary.

Today a number of data dictionary products are available commercially. Most of these are described in depth and analyzed in the previously mentioned book. In some respects the differences between the various products can be substantial.

The decision to use a data dictionary system, as well as the selection of the particular system to be used, should be made carefully. A proper assessment of the benefits to be realized as well as the costs that will have to be incurred should be made.

The cost of acquisition of the data dictionary system itself is usually a small part of the total cost. Provisions for the entry of data to the dictionary, the on going maintenance of this data and the development of procedures re-

(Continued on Page 34)

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JACKSONVILLE, Fla. — The phrase "keep on trucking" could never apply to anyone more than it does to both Ryder truck lines and Transportation Teleprocessing Systems, Inc. (Trans-Tel). Ryder had revenues of $59.76 million in 1966 and more than $262 million in 1976. That's an increase of 340%!

One answer to this phenomenal growth is the dedication of the employees at both firms to the concept that they are part of one of the finest overall transportation systems in the country. Trans-Tel was formerly Ryder Truck Lines' DP department.

Prior to December 1971, Ryder was using a teletypewriter message switching network. Then the company installed message switching on its IBM 360/40, handled by a modified version of Qtam. The terminal system at that time reached about 80 locations.

Trailer control, the first application, was added to the system in May 1972. This provided up-to-the-minute information on all trailers involved in the intercity movement of shipments.

Evolution Begins

In June 1972 Brian Doran was hired to manage the computer operations and communications network. Under his guidance and management the evolutionary process began.

The control of tractors and over-the-road drivers involved in the intercity movement of shipments was added. This now provided the company with complete information concerning three factors that have a direct impact on customer services.

. To meet the demands of the growth being experienced by Ryder, Trans-Tel was formed as a separate company in early 1973 and continued handling the corporation's DP and communications needs.

In May 1973, the second IBM 360/40 was added to insure system backup and 24-hour uptime. The next year was spent fine-tuning and expanding existing systems.

In May 1974, the on-line payroll system was added. It now produces more than 1,400 checks each week for drivers and does not require any paperwork to be sent to the office. In a period of 2-1/2 years the communications network had expanded to 150 communication terminals.

Meanwhile, Doran had begun looking for a data communications monitor to replace the home-grown Qtam-based system. Using a Datapro Research Corp. publication as a guide to potential suppliers, he decided in the fall of 1975 to acquire Total, the data base management system, and Environ/1, the communications monitor from Cincom Systems, Inc.

By the end of June 1976, Trans-Tel had rewritten and tested all of the trailer control, tractor control, driver control and on-line payroll programs and developed an up-to-date message switching system.This was done by a staff of five people, who also had to convert batch programs to function in a data base environment.

Growth presents problems as well as opportunities. TransTel now had about 180 active terminals on its network. The congestion resulted in an extremely serious deterioration of service to the users. This could not be tolerated even though a solution had not yet been determined.

Response time at the terminals varied from 15 seconds to 2-1/2 hours. Placing hardware monitors on its 360/40, Trans-Tel found it was using 97% of its CPU resources. In June 1976, one of the 360/40s was replaced by a 360/65 with 15 to 20 terminals on each of 14 circuits transmitting data 1,200 bit/sec. Response time dropped to a level consistently below 10 seconds.

On July 3, 1976, Trans-Tel shut down the old Qtam system and brought up the new Environ/1 and Total systems three hours later.

True Benefit Seen

"It was around October of 1976 that we realized the true benefit of data base/data communications (DB/DC)," Doran said. "A user came to us with a request for a new inquiry transaction. We were able to respond and have it operational within 24 hours," he said.

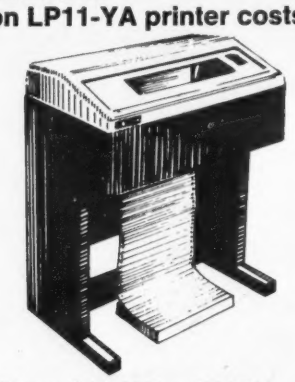
When asked to what he attributed the success of Trans-Tel's on-line network, Doran said "the success of any system depends on the amount of

(Continued on Page 34)

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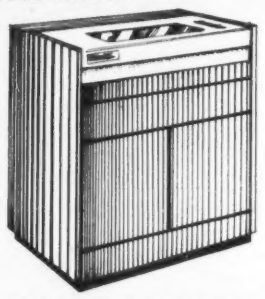
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Mixed Billing Technique Controls DBMS Accounts At Corporate Data Center

Special to CW

FULLERTON, Calif. — When you're faced with the constant yo-yo program of terminals being installed and taken out, the ability to accurately account for your total data base management system's (DBMS) budgets becomes very difficult.

That was one of the prime problems facing the Data Base Services Group (DBSG) of Hughes Corporate Data Processing Center here when it began exploring new methods for billing its customers for work handled by IBM's information management system. Operating under ASP, the group has an MVT 21.8 system that uses IBM 370/165s to support 65 IMS terminals in Southern California and Arizona.

The IMS billing system they had been using was based on a fixed charge per terminal plus hardware costs.

Chuck Allen, supervisor of DBSG, explained that at the beginning of each year, all of the resource and people costs were put into a pool. They then estimated the number of terminals which would be in operation, divided the pool costs and used that figure as a basis for their fixed terminal charges.

"The problem was that business is never static," he commented. "It is in a constant state of fluctuation. Because of the way we had established our charges, people would have the terminal removed when they had a downturn to avoid the cost. Then, when things got better, they would have the terminal installed again. We had to have a way of smoothing out the peaks and valleys."

In addition, the group wanted to have a more complete picture of system characteristics and profiles.

Flexible Package

To develop the control and accounting information it needed for the IMS system, DBSG chose Boole & Babbage's Control/IMS product.

"We weren't certain whether we would use the resource or transaction billing techniques, and Control/IMS would provide us with the flexibility and information we needed to make the best possible decision," Allen said.

DBSG felt that resource billing would be the most desirable technical method because it would provide a better control mechanism on users to refine some of their more poorly designed systems, which were using excessive amounts of IMS resources. Allen noted that this approach would provide the user with a "profit" initiative and free up resources for new applications.

While resource billing may have been the most desirable method of charging back the system, it was totally unacceptable from the user's standpoint. "First of all, budgeting by resource item by non-data processing personnel is too difficult," Allen explained. "To do it properly, they would have had to learn our language and right away you know you have a giant roadblock. Secondly, they couldn't budget for the year with any confidence since they didn't have the history file they would need to base costs on."

With the approach thought most desirable from DP's point of view, DBSG moved to transaction billing.

Initially, they set up three types of transactions — updates, inquiries, and data collection. They then spent three months computing various ways of charging for these transactions so that they would recover their costs.

"To accomplish this," Allen said, "we used all of the performance reporting tools available with Control/IBM."

They studied reports on who the users were, what levels of service were being provided and what and how much work they were doing. They also studied the high activity data bases that performed efficiently and how each data base was being used. They also studied transaction, program and region reports to develop a comprehensive and accurate picture of their system's characteristics and profiles.

"We suddenly found that by categorizing the types of transactions we had originally planned, we would be penalizing some systems more than others," Allen recounted. He explained that straight transaction billing penalizes heavy volume transactions that use few resources. However, update transactions that are clumsily written and poorly designed don't bear their proportionate costs.

Because of this, the group developed a system which was more equitable. "We now have a system which has three types of transactions, all charged at different rates," Allen stated.

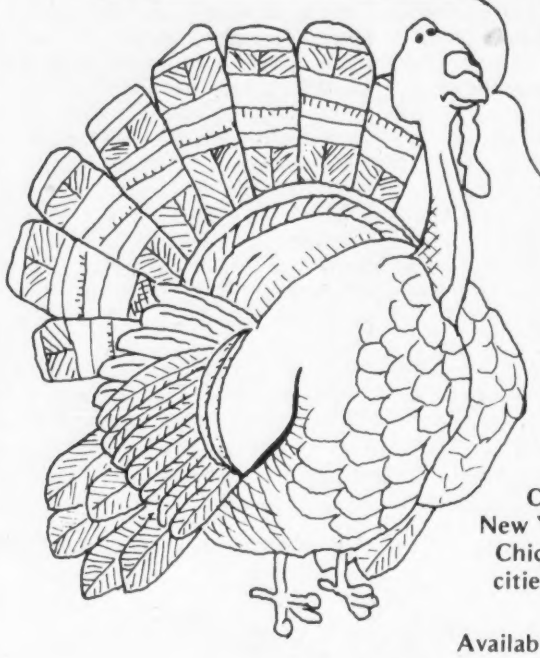
As a result of the improved billing technique, Allen's group has found there is a greater utilization of the IMS system. No one is asking to have his terminal removed when business is down and there is an increasing number of requests for more terminals.

"Management is very delighted with the fact that we can now accurately account for our operation," Allen said. "But we like it because now we can control our IMS situation. In addition, we're getting better action with our users as far as budgeting and new applications are concerned." He explained that users are constantly reassessing their budgets and are requesting trend and forecast information.

"We've had a number of other monitoring tools we have used in the past," Allen commented, "but Control/IMS provides us with all the information we need regarding what's going on in the system and it puts all of the data in one place rather than in a volume of reports here and there. We've been able to totally eliminate the use of DC monitors, tune new programs and applications and even troubleshoot when things go wrong. To develop the necessary performance reporting information, they operate Control/IMS on both their test and production systems.

According to Allen, though, the best benefits are a result of the need. He noted that since management was holding his group accountable for the way they were "running their business," they can now control and account for the business in a professional manner.

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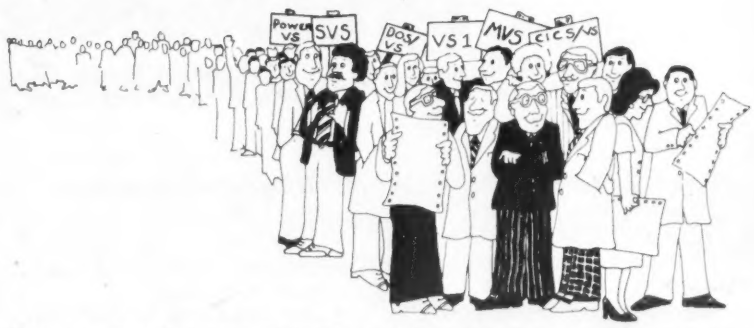
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Trucker Takes DBMS Route and Boosts Profits

(Continued from Page 31)

planning and experience that you have to put into it. We spent four full days with a Cincom Systems' engineer doing nothing but data base design on the front end of this system. The data communications aspect was the easiest for us. We knew what we wanted and we had four years of data communications experience. As long as Environ/1 and Total did what we were told they would do, we didn't anticipate any major problems," he said.

Never a Problem

"Since installing Total, we have never had a single problem with the software and there are not many products you can say that about today. Environ/1, on the other hand, did cause us some problems initially. Proper consideration had not been given to the tremendous volume of administrative messages we would transmit daily," he explained.

"We also had some annoying problems in our method of queuing incoming messages," Doran noted. "We were handling too much data for our original Total queuing technique. After discussing several possible solutions with Cincom, steps were taken to implement a byte string queuing technique which proved to be much faster," he said.

Trans-Tel now averages a message every two seconds, 24 hours a day, seven days a week, including all time for shutdowns, implementing new applications, backups and CPU downtime. "As you can see, we just had too much volume for our original queuing method," Doran said.

During the third quarter of 1976, Trans-Tel added several inquiry applications while maintaining the existing system. In the fourth quarter work began on sales applications to assist 167 salesmen and 160 terminal managers. This system was installed in January.

Another application implemented this year is the preventive maintenance inspections of all city equipment.

Currently, Trans-Tel is running two 512K IBM 360/65s under basic Edos with Memorex 3670 disk devices. Environ/1 is currently in a 348K partition, including a data base module size of 50K utilizing 20K for Btam.

There are 206 communication terminals on the network utilizing 14 lines at 1,200 bit/sec. Consideration is presently being given to expanding the network to 27 data circuits to further improve response time.

Data Dictionary Key to Control

(Continued from Page 30)

quired for the integrity of the system can be quite expensive.

Of all the projects undertaken by an organization the data dictionary is perhaps one of the most critical. Central to the success of a dictionary project is the degree of commitment that exists at all levels of the organization, including the highest levels of management. Proper understanding of the costs and benefits involved is a key element of this issue, this being true regardless of the environment in which the dictionary will be used.

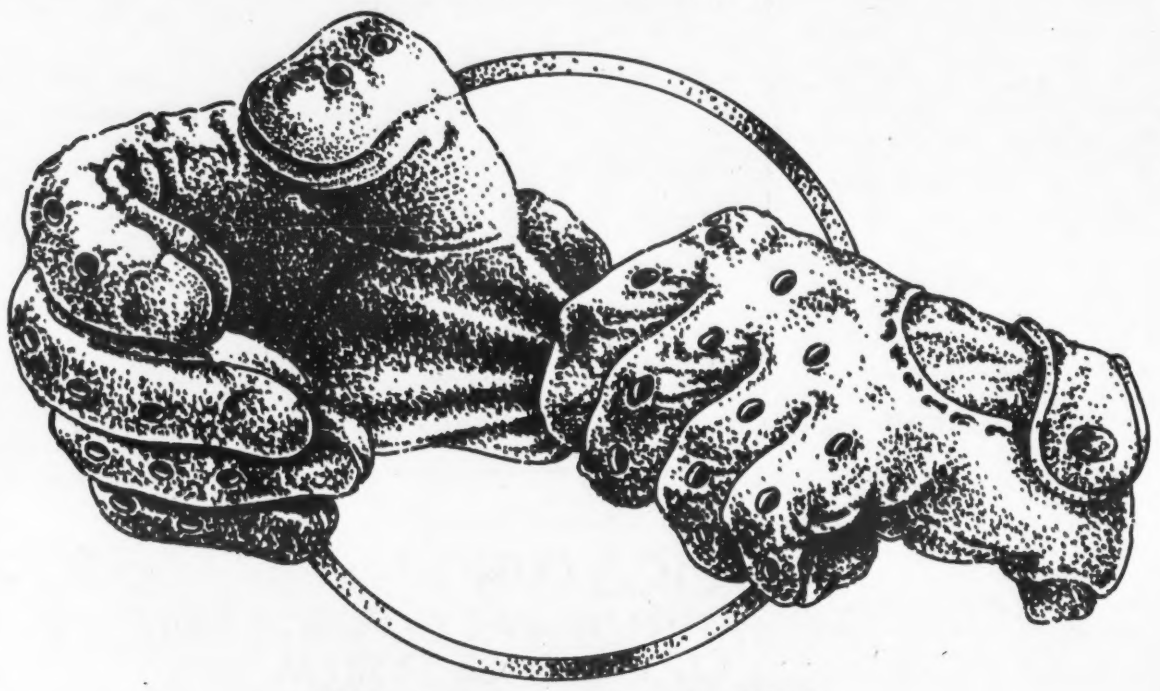
Responsibilities

Similarly, the administration of the dictionary itself must be reflected in the organizational structure of the enterprise and a clear assignment of the responsibilities associated with the integrity of the contents and use of the dictionary must be made.

The importance of data dictionary systems will continue to increase in the future. It can be expected that many parts of the total computing system will avail themselves of the facilities contained in a data dictionary system and some of its logical extensions, such as distributed processing and/or data bases. Additional momentum will be provided by privacy legislation, as the data dictionary system is a viable tool for the documentation of the usage of data and showing compliance with such legislation.

Lefkovits is the president of Henry C. Lefkovits & Associates, Inc. of Harvard, Mass., a consulting firm.

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KEY CON-TROL

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SEE PAGE 3.



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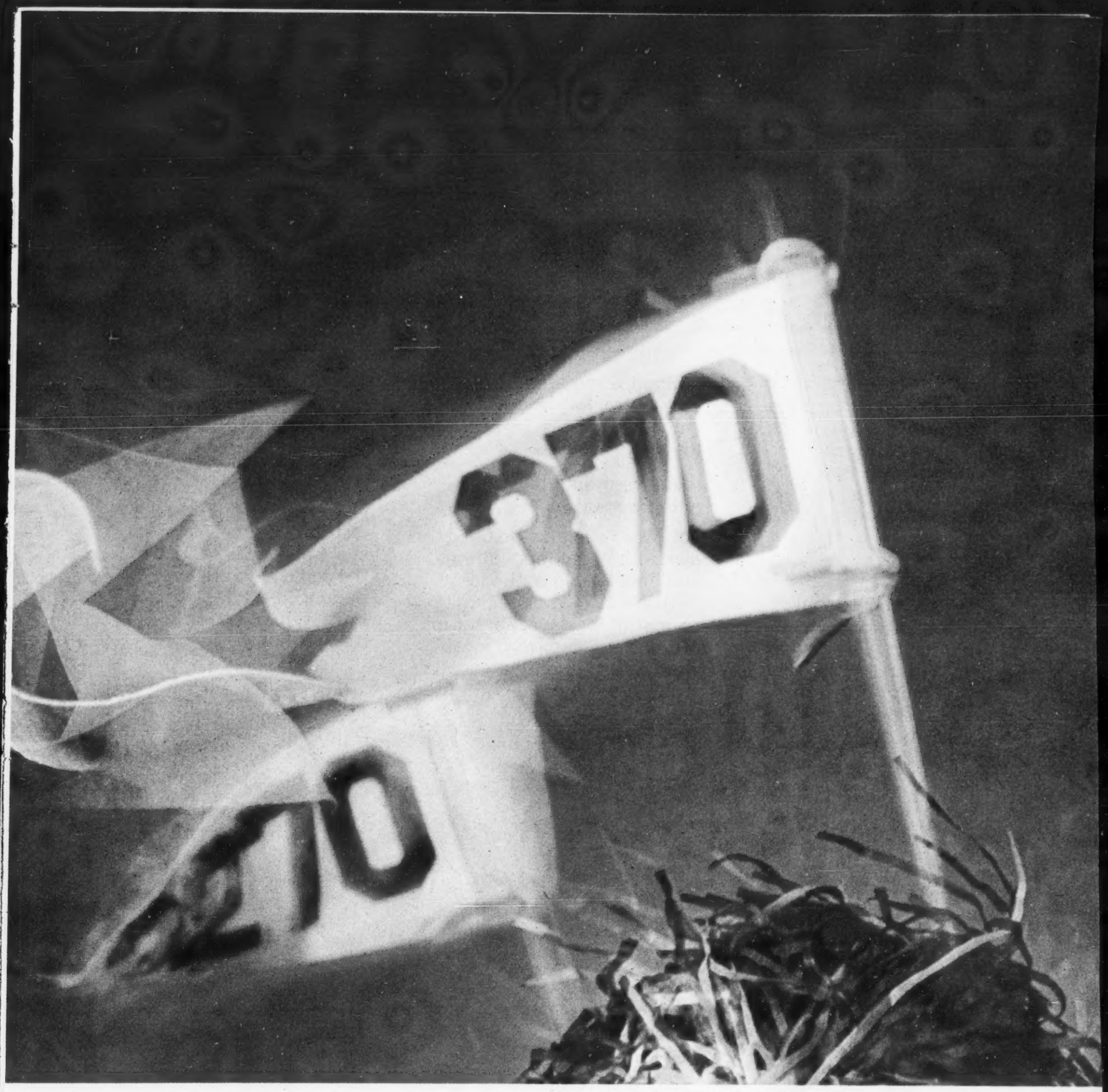
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'Latest Features' Don't Matter

Performance Seen Key to Terminal Use

By Ronald A. Frank
CW Staff

LOS ANGELES — Users should not be concerned if their communications terminals do not incorporate the latest state-of-the-art features. If the devices do the job for which they were intended, then they were worth the cost, according to Dennis J. Cagan, president of The David Jamison Carlyle Corp., a terminal supplier.

In advising users on how to select CRTs and teleprinters, Cagan told attendees at a recent Interface West session here that once a required set of features is defined, the next area of concern should be equipment reliability.

When it comes to reliability, Cagan said, most terminals have about the same performance levels. A CRT can be expected to fail about two times per year; a teleprinter will fail about three to four times per year on the average, he noted.

One of the best ways to evaluate potentially suitable devices is to ask vendor salesmen their opinions on competitive equipment. Although some users view this approach as being questionable, there is nothing wrong with the user taking advantage of any information which he can gather before making a decision, Cagan said.

Another way of getting information on equipment under consideration is to contact existing customers. Whenever possible, the user should first try to find nonsatisfied users of the terminals, he suggested.

Competing sales representatives often have information about unhappy users since these are the type of prospects to which they are interested in selling, Cagan said.

After any negative information has been collected about a particular terminal, it should then be discussed with satisfied users to see whether it is accurate or just relates to an isolated case.

Existing CRT and teleprinter users should be asked specific questions on how the vendor reacted in maintenance and other support situations. It is also important to find out whether the vendor complied with promised delivery schedules or whether the terminals were installed late, Cagan stressed.

An existing user should be questioned on the level of service provided when malfunctions occur. The user's real opinion of a vendor will probably come out when he is asked whether he would buy the same terminals again or whether he plans to add more in the future, Cagan told the attendees.

Terminal users should carefully evaluate the need for vendor maintenance, he added. Many of the currently available terminals can be maintained by most staff members who can use a screwdriver, he explained.

Most one-year maintenance policies cost at least $12.50/mo per terminal and it may be less costly to stock spare components like circuit boards and replace them in-house. If a staff member can repair a teletypewriter, there should be no problem with maintaining the current CRTs and teleprinters, he said.

In the area of pricing, local distributors often provide terminals at lower costs than the vendor. In addition, the user should be aware of available discounts; it may be less cost per unit to get a larger number of terminals if this puts the user into the next higher discount bracket, Cagan said.

CW at Interface

PTTs Hold Nine-Tier Job

LOS ANGELES — Although it is widely known that the Postal, Telephone and Telegraph (PTT) authorities in various foreign countries are responsible for administering communications services, the exact areas covered by the PTTs are not often defined, according to Leonard Elfenbein.

Speaking at an Interface West session here recently on international carriers and services, the consultant said the PTTs are responsible for nine major types of services in most countries.

Time-sharing and data base applications are covered by the PTTs, as well as joint use and line-sharing regulations. Transmission of data across national borders and the administration of data on switched public networks are also PTT responsibilities.

Telex dial-in and dial-out services and data terminating regulations fall under the domain of the PTTs, as well as the administration of interconnection, which includes authority for type approval of accepted equipment.

The PTT's responsibilities also include the encryption of data and cover Telex, public switched networks and private line facilities. In addition, the PTTs set tariff surcharges and discounts depending on local regulations.

Discounts are often offered if a user selects a country as a hubbing point in an international net. In rare cases, surcharges can be levied, for example when a user does not transmit data at the rated speed of a line, Elfenbein said.

Software Provides Telenet Link For Burroughs, Univac Systems

WASHINGTON, D.C. — Telenet Communications Corp. has developed software packet network interfaces for Burroughs B6700 and B7700 systems and Univac 1100 series systems.

Both interface packages will be provided by Telenet under a licensing arrangement and are expected to be available for customer installation next month, according to a spokesman. A similar network interface for IBM 360/370 systems has been offered by Telenet for some time.

The software interfaces are said to offer two advantages to network users, faster response time and lower cost. They permit the user to handle a large number of simultaneous virtual connections over a single full-duplex access channel connecting the computer to the Telenet network, the spokesman said.

In addition, the software features full error control between the host computer and network and statistical multiplexing which minimizes bandwidth requirements, Telenet said.

The Burroughs interface supports asynchronous terminals and communicates with the network using the CCITT X.25 packet protocol. The package was designed to operate on any B6700 or B7700 with a Burroughs data communications processor.

The Univac interface operates as a user program at the real-time level and uses the Telenet Host Interface Protocol to handle asynchronous terminals.

The Univac interface can be used on 1100 series systems which have at least 192K words of memory and a high-speed synchronous communications terminal module.

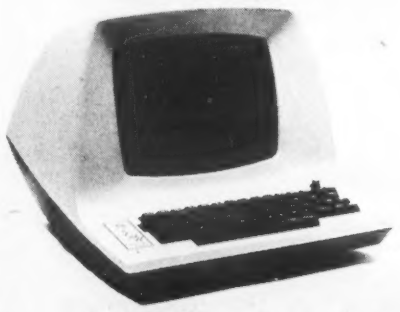
Both interface packages will be offered by Telenet for a one-time installation and licensing fee of $1,000 and a recurring fee of $325/mo covering maintenance and program updates. Telenet is at 1050 17th St. N.W., Washington, D.C. 20036.

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Vadic Modem For Dial Lines

SUNNYVALE, Calif. — An originate-only full-duplex 1,200 bit/sec modem for use on dial-up lines is available from Vadic Corp.

Designated VA3416, the modem costs $720 including VA1601V chassis and power supply.

The VA3416 is crystal-controlled and can transmit and receive at 1,225 bit/sec permitting it to operate with multiplexers. With Vadic's data access arrangement, registered with the Federal Communications VA3416 directly connects to any dial-up telephone, the company said.

Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

Computek Adds Text Processing System

BURLINGTON, Mass. — Computek, Inc. has enhanced its Series 200 intelligent terminal system with a communications-oriented text processor.

Called Econotext, the system combines the Series 200 processor with up to four 2,000-character CRTs, 1.5M bytes of mass storage, optional hard-copy printers and software for text input, file management and applications programs.

Econotext software includes three operating modules: The editing module controls editing and movement of text on the CRT screens; the file management module lets the operator store, retrieve and manipulate text on diskettes and access print routines; and the communications module allows the system to transmit text one-way to remote sites.

The system is designed for use by newspapers as a reporter station, remote bureau terminal or in newsrooms, the company said.

Econotext can transmit data at speeds up to 9,600 bit/sec and it is compatible with United Press International and Associated Press high-speed wire service protocol, Computek said. Since communications is under program control, other protocols can be implemented.

Exceptional Clarity Claimed

The system CRTs display the 128-character Ascii upper and lower case set plus control symbols using a 20 by 14 dot matrix, which the firm claims has "exceptional clarity." Each terminal can access text in its own memory buffer of 5,400 characters and the contents of the buffer can be altered by writing or reading from local diskette storage.

A typical stand-alone system with dual drive floppy disk, 5,600-character buffer and communications costs $11,250. A "quad" system including four CRTs, floppy disk, buffers and communications costs $22,500 or $5,625 per terminal.

Computek, a subsidiary of General Automation, is at 63 Second Ave., Burlington, Mass. 01803.

M&R Enterprises Has Modem in Kit Form

SUNNYVALE, Calif. — The Pennywhistle 103 acoustic coupler, a modem in kit form, was introduced by M&R Enterprises.

The unit can record data from a terminal or a computer on audio tape for playback and can also be used for telephone "hamming" or communications with the deaf, according to a spokesman for the firm. Data recordings can be made without critical speed requirements and the device will operate in the half-duplex or full-duplex mode, he said.

The kit, which includes a three-stage filter and complete documentation, costs $129.95 from M&R Enterprises, P.O. Box 61011, Sunnyvale, Calif. 94088.

Teleprocessing, Nets Subjects of Course

NEW YORK — A course on teleprocessing (TP) systems and network design will be offered by American Management Associations here on Nov. 28-Dec. 1.

The course, meeting at association headquarters, will cost $540 for association members and $620 for nonmembers. Team discounts are available for groups of three or more at $460 for association members and $525 for nonmembers from American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Guess who gets to do Replacement Cost Measurement this year?

Probably you!

Last year was the first time the SEC required major corporations to undertake replacement cost measurement. Complying with Accounting Series Release 190 (ASR-190) was a struggle. For the most part, the job was done manually by staff. It took loads of time, cost plenty of money and so companies are now looking for an easier way to do it.

This year many corporations are assigning this responsibility to data processing departments. Now you're wondering whether internal or external systems development is the answer. Relax, we've got an alternative.

Meet VSCOM-190

VSCOM-190 is a system designed by Valuation Systems Corporation and available on COMSHARE's international timesharing network. It enables your company to effectively comply with ASR-190. VSCOM-190 provides:

1. Solid experience in replacement cost/current value measurement. Many major corporations got accurate information from VSCOM-190 last year.
2. Up-to-date and comprehensive domestic data that is immediately usable without refinements.
3. The most extensive foreign index data available anywhere.
4. A special module which makes it easy for you to gather your company's basic data.
5. A system that has been updated to reflect the latest SEC requirements.
6. Low, low cost with charges based only on usage. In fact, experience has shown that these costs are much lower than if you did it manually.

There's much more you should know about VSCOM-190. For more information, send in the coupon below, or call Bob Held at (313) 994-4800.

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Hewlett-Packard

Computer Advances

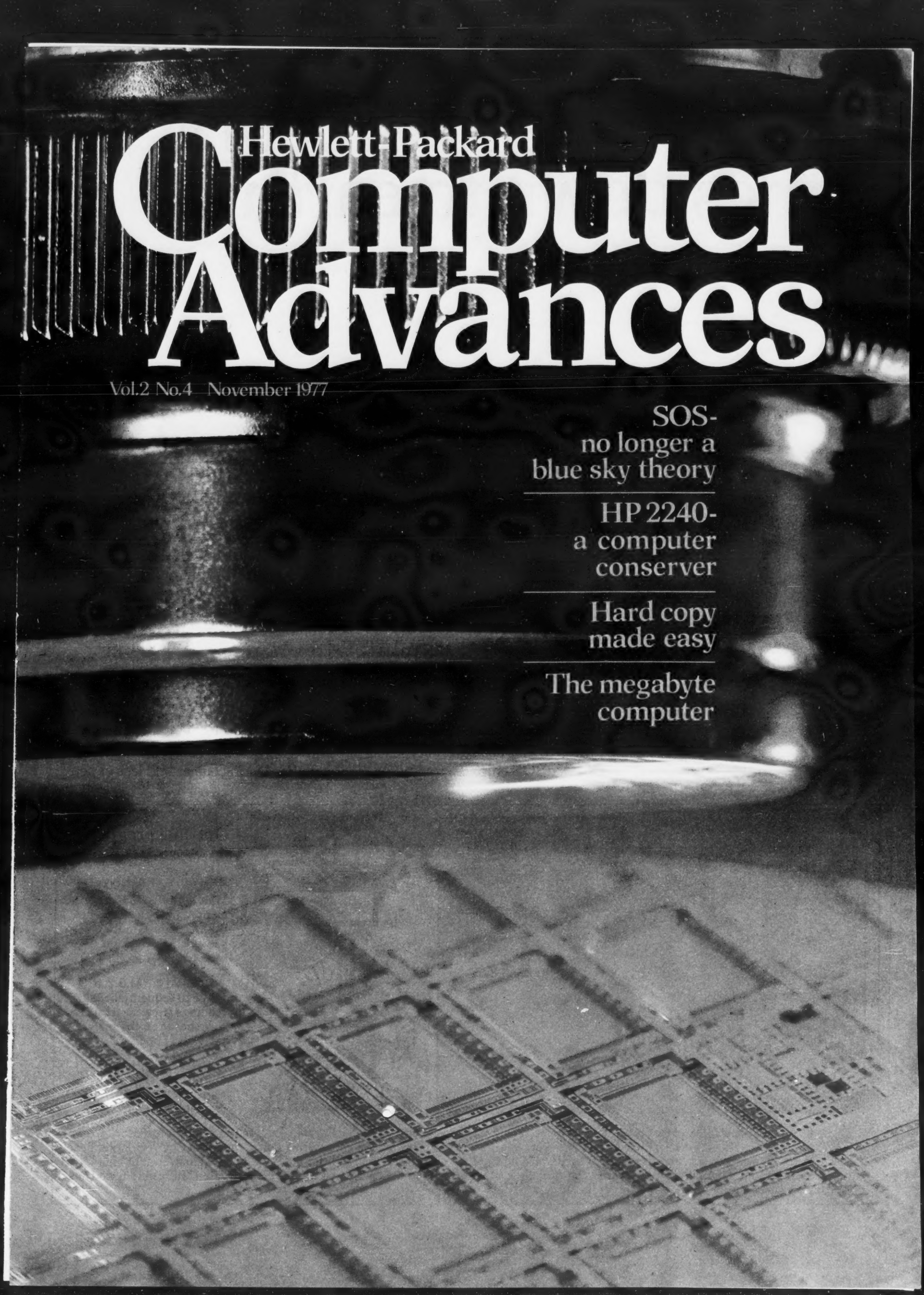
Vol.2 No.4 November 1977

SOS-
no longer a
blue sky theory

HP 2240-
a computer
conserver

Hard copy
made easy

The megabyte
computer



SOS - a blue sky theory comes down to earth

Five years ago, Hewlett-Packard established its silicon-on-sapphire technology laboratory in Cupertino, California. This investment was prompted by a recognition of the customer benefits to be gained in our products from a CMOS/SOS (complementary Metal-Oxide Semiconductor, Silicon-On-Sapphire) process.

With sapphire, a non-conductive material, we can achieve superior dielectric isolation which enables high speeds and close packing of circuits. We are also able to eliminate parasitic capacitance.

For example, our Phi chip, with an area of 28mm^2, contains 8,000 transistors. Phi serves as a single chip interface between any microprocessor bus and the HP-IB;* and runs at speeds up to one megahertz while typically consuming only 300 milliwatts. Low power consumption is another SOS charactertistic.

Much of our effort during these years has been in establishing reliability and producibility. HP has recently introduced three new products that use several types of CMOS/SOS chips...

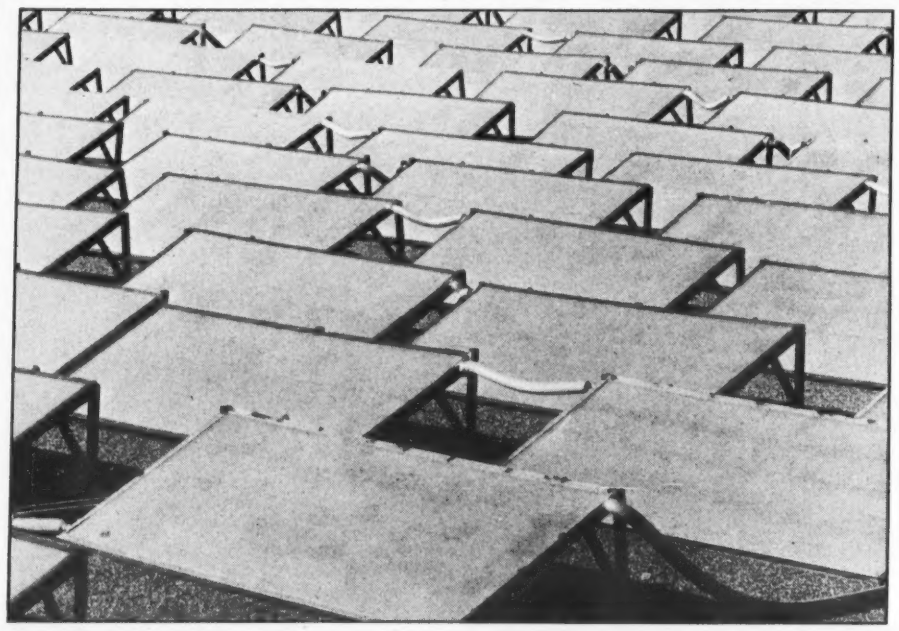
◀ *Cover*
There is an average of 200 dies on one of our three inch SOS wafers. The process of separating them into individual chips is similar to that of glass cutting, but as sapphire and diamonds are nearly neighbors on Mohs Hardness Scale, it is not possible to score the wafers with any diamond cutter. Only a laser scriber, whose power reaches far into the deep infra-red, can melt and evaporate the sapphire in preparation for mechanically breaking the chips apart.

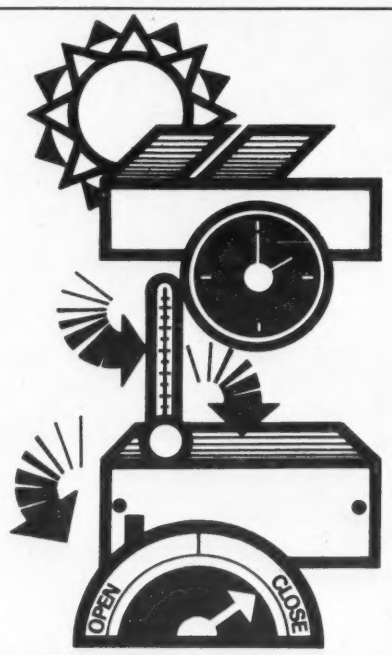
With SOS, the HP2240 is a computer conserver

The HP 2240 processor is HP's first measurement and control subsystem based on SOS technology. It simplifies product testing and real-time data acquisition, monitoring, and control; and can be used with 21MX-based systems, HP 1000 computer systems, or HP 9800 series desktop computers. The HP 2240 can also operate remotely with the HP 3070 data collection terminal or over telephone lines with HP's common carrier interface.

Built-in intelligence

Microprocessor-based intelligence makes testing easier and less expen-





One-line program

WU,600,000 AI,3,2,10, A0,4,3,1,50!

Time WU, 600,000
Wait until the 2240A elapsed time clock reaches 600 seconds, 0 milliseconds, which is ten minutes.

Measure AI,3,2,10
Input 10 sequential analog readings from the temperature sensor on channels 2 through 11 of card 3.

Control A0,4,3,1,50!
Output 1 analog voltage to to the hot air damper to close it 50%.

Solar heating is just one application that can be automated with HP's new measurement/control processor. For example the HP 2240 can **measure** room temperature at specified intervals—every ten minutes, for example—and **control** that temperature by regulating heat transfer from the system's solar panels. This is accomplished by three simple statements from the HP 2240's extensive set of high level commands. A similar solar panel-to-hot water heat transfer system was initiated by employees at HP's Sunnyvale, California site and has been running successfully for the past four years.

sive than with previous systems. With HP's Micro-CPU Chip as its heart, this processor executes critical real-time tasks that previously had to be handled by the computer. This frees the computer to do more appropriate tasks.

High speed, low power

SOS technology allows the HP 2240 to gather, store, and correct measurements at a fast 20,000-per-second rate. Yet this impressive performance is possible with a minimal amount of power — the HP 2240 draws no more current than a 150 watt lightbulb.

Easy as one, two, three

Microprocessor control couples with the Hewlett-Packard Interface Bus (HP-IB*) capability and can make an HP 2240 system operational within hours, in three easy steps.

First, you interface the HP 2240 to the computer via a single HP-IB cable; second, connect the HP 2240 to your sensors or controls via one of a large assortment of measurement/control cards; and third, instruct the HP 2240 to perform the real-time task with the aid of a simple, one-line program.

Two in one

The HP 2240 has the ability to measure and control both analog and digital signals, thus lowering automation costs in manufacturing and

Continued on page 5

*HP's implementation of IEEE Standard 488-1975 "Digital Interface for Programmable Instrumentation," and identical ANSI Standard MC 1.1.

Hard copy made easy with SOS-the HP 2631/2635

The new line of HP 2630 serial printers has just been announced. The HP 2631 is designed for environments requiring a low-cost, high performance printer. The HP 2635, the same high throughput printer with a keyboard, is suited to interactive environments. These printers operate at 180 characters per second (cps.)

Both printers are controlled by a silicon-on-sapphire (SOS) microprocessor system designed by HP.

Printing versatility

The HP 2631/2635 offer as standard features those capabilities that are often optional on other printers. For example, there are three print modes — normal (10 characters per inch), expanded (5 characters per inch) for titles and headings, and compressed (16.7 characters per inch). Compressed mode, an economical paper saver, allows you to generate reports in 8½ by 11 inch format with 132 characters per line, and to pack 227 characters per line on standard-sized computer paper. These three print modes can be intermixed on a single line. Lines can be spaced at vertical pitches of 1, 2, 3, 4, 6, 8, or 12 lines per inch, so the printers accommodate subscripts and superscripts.

The HP 2631/2635 support the USASCII 128 character set, including control codes which are accessible through the display functions. Use of a 7-column by 9-row dot matrix allows printing of descenders (for normal looking "g's" and "j's"), commas, semicolons, and underlining. You get high resolution print that is crisp,



HP 2631

HP 2635

clear, and readable—even on the sixth sheet of a multiple-part form.

The HP 2631 is bilingual, supporting two full character sets (one standard, one optional), and can intermix the two on any one line. Alternate sets so far include Swedish/Finnish, Spanish, French, German, Norwegian/Danish, and British.

High throughput

Consider the path taken by the print head. It is bi-directional, fast, and determined by a "smart printing" algorithm that selects the optimal path and speed. By the time one line is printed, the next several lines have been processed and stored in a buffer. Leading and trailing spaces have been detected and ignored—the head moves directly to the first character of the next line to be printed. When ten or more adjacent spaces have been detected within a line, the head speeds to the next printable character at an accelerated rate of 450 cps, a major time-saver when printing tabular data.



The HP 2631/2635 choose the most efficient direction (left-to-right or right-to-left) for the print head to move. Smart, bi-directional printing can increase throughput as much as 50%.



A sixty yard, inky, mobius strip has been packed into this cartridge for quick, convenient, and clean insertion into the HP 2631/2635 printers.

Design and mechanical simplicity

The HP 2631/2635 are simple and modular in design, removing some of the hassle and cost often associated with printer ownership. The number of mechanical parts has been reduced to lessen the probability of breaking down and wearing out. One servo-motor, for example, drives both the print head and ribbon cartridge. To improve serviceability, boards plug in and pull out quickly. Loosen only six screws to ready the printer for repair.

Trouble-free ownership

Both printers are adjustment free. The chassis is factory-adjusted and "sealed" for life. The nine-wire, ballistic, print head is a simple, dynamic system which self-aligns and can be easily replaced.

The printers are clean—you'll never touch an oil can again since key moving surfaces are a teflon-based material. When changing the ribbon cartridge, you'll never touch the inky fabric.

The inexpensive, trouble-free cartridge ribbon also shows the designers' concern for mechanical reliability. The cartridge employs a mobius loop, which allows full surface use of the ribbon and ensures that printing is always on a fresh part of the ribbon. The ribbon normally needs changing only after 10 million characters. The print head is also conservatively rated at 100 million characters.

The HP 2630 family is designed with user convenience in mind. Additional features include a self-test capability that assures you the printer is operational. Pedestal and desk-top versions blend into office environments.

Mechanical simplicity, long-life parts, and no adjustment—all contribute to ease of use and low cost of ownership.

These printers are ideal output and/or input devices for HP and other computers, calculators and CRT terminals. Interfacing is via RS232 (CCITT V.24) and 20mA current loop options on the HP 2631/2635, plus differential I/O, 8-bit parallel TTL, and HP-IB* options on the HP 2631.

The U.S. price for the HP 2631 printer is $3150 and $3450 for the HP 2635 printing terminal. OEM discounts are available.

It is difficult to reproduce here the quality print produced by these printers. **Request a live demonstration or more information by checking "B" on the reply card.**

*The Hewlett-Packard Interface Bus (HP-IB) is Hewlett-Packard's implementation of IEEE Standard 488-1975, "Digital Interface for Programmable Instrumentation."

Continued from page 2

engineering. Typical industrial applications range from monitoring offshore oil drilling to counting and routing wine bottles.

Decouple and delegate

The HP 2240 has the innovative ability to decouple automation tasks from the computer. Timing, scanning, event synchronization, formatting, and interrupt tasks can all be delegated to the HP 2240.

One-line programs

An extensive set of high-level measurement/control commands is another innovation. Users delegate tasks with one simple program statement. Requests to perform a task are generated by write or print statements in familiar BASIC, FORTRAN, HP Assembly, or HPL languages, as shown on page 2. The HP 2240 stores the instructions in memory and executes them in sequence, without further computer interaction.

Self-test

Part of the HP 2240 microprocessor design is self-test. Built-in ROMs and a separate self-test fixture allow users to run off-line diagnostics. This feature can lower repair costs and speed installation.

The HP 2240, with a typical mix of analog and digital I/O cards, costs about $6,000. High performance automated test systems based on the HP 2240 range from $10,000 to $27,600. Volume discounts are available. (U.S. prices only.) **Check A for details.**

A million-in-one

A million bytes in one small box. That's how much memory Hewlett-Packard now packs in the "megabyte computer"—one million bytes of "fault control" memory in a 12¼ inch high HP 21MX package for only five cents a byte. Through the use of a memory extender, memory capacity for HP 21MX systems can be increased even further to a total of 1.8 megabytes.

Increased density was made possible by a new 128k byte memory module based on 16K-bit, N-Channel, MOS/RAM memory chips—the first in use by a major manufacturer of small computers.

Better throughput

The expanded memory system is especially suitable for real-time, multi-programming applications where high throughput is critical; for example, high-speed data acquisition and process control. With a megabyte or more of programs resident in memory, the delays inherent in swapping to and from a disc are eliminated.

HP gives you a bit more

The increasing popularity of large memories in small computers makes

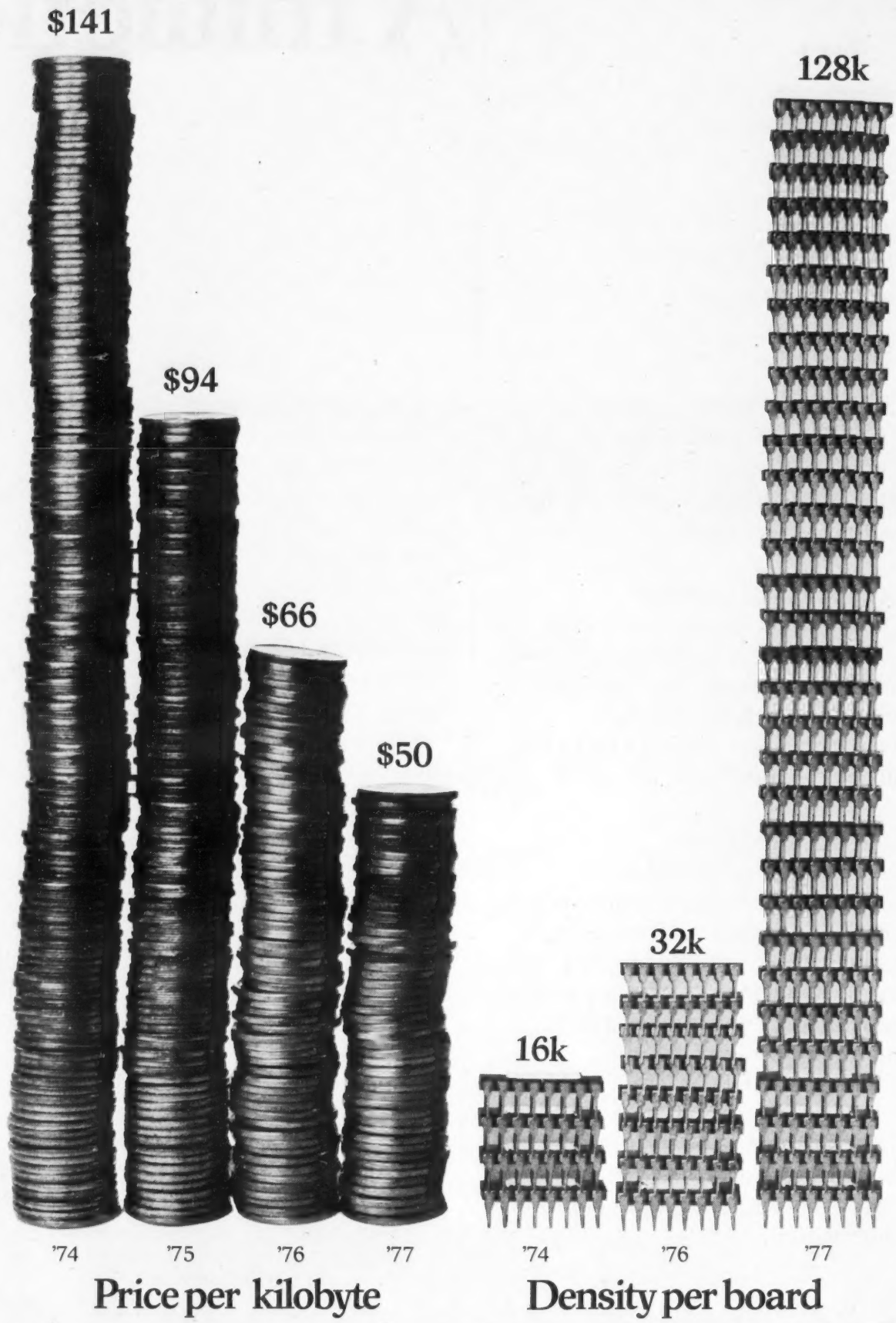


The "megabyte computer" and the 128k byte memory module—Hewlett-Packard's latest high-capacity memory packs one megabyte of "fault-control" memory in a compact 12¼ inch high HP 21MX mainframe—all for only 5 cents a byte.

memory reliability a major contributor to overall system reliability. Recognizing this, Hewlett-Packard also introduced a new "fault control" capability, which provides for detection and correction of all single bit memory errors. This is accomplished through use of a standard 21-bit Hamming code. But, HP goes one bit further.

There is always the remote chance of a double bit error. We added a 22nd parity bit to the Hamming code, enabling us to detect all double bit errors. Programs will continue running and data will be protected even if a memory chip malfunctions.

The new "fault control" system is expected to provide a significant improvement in Mean Time Between Failure (MTBF) of basic HP 21MX memory modules. This is especially important to large memory systems. For example, we would expect an MTBF of roughly one year, without the probability of a failure on the "megabyte computer." Memory stays operational so maintenance can be performed on a scheduled rather than emergency basis.



Since Hewlett Packard's early commitment to semiconductor memory, we have been able to bring customers memory price decreases at an average of 30% a year, and memory density that has gone up and up. The most recent HP 21MX memory system using 16k RAMs quadruples memory board capacity from 32k to 128k bytes.

When there's dirt in the air...
Memory-based systems, as you will read in the next article, can tolerate "unfriendly" environments. Such systems are excellent for remote, unattended locations where reliability is critical; for example, on offshore oil platforms, on shipboard, or in planes. The go anywhere, "megabyte computer" is ready to work without the need of air conditioning, elevated floor, or lots of space.

A nickle a byte
Density and reliability are not the only advantages of semiconductor memory. Cost savings is another. The new 128k byte memory module is priced at $6,400 (U.S. prices only)—just five cents a byte. "Fault control" memory is optional and available as a controller and associated check bit arrays. Existing HP 21MX customers can easily upgrade to larger memories.

More information on HP's large memory system is available. **Just respond to C on the reply card.**

Think big, even if you start small

With RTE-M, Hewlett-Packard's new real-time operating system, you can use big memories. RTE-M, software for HP 1000 and 21MX computers, can handle HP's memories up to 1.8 million bytes. But, you can start a system with as little as 32k bytes of memory.

M is for memory

RTE-M is memory-based, which ensures extremely rapid response time, within hundreds of microseconds. All system software and user programs are resident in main memory where they are instantaneously available for execution. There are no time delays caused by transferring programs in and out of main memory.

Good response time is further assured by a user-defined, flexible scheme for assigning priorities. Tasks are executed according to their specified priority as computer time becomes available. A time-critical program is guaranteed full and immediate computer attention and is run at optimum speed.

Flexibility further distinguishes RTE-M: it comes in three modular versions. Each customer chooses the tailored version that best matches his or her requirements. There's no hardware and software overhead.

The simplest system configuration supports a single terminal with 32k to 64k bytes of main memory. Intermediate systems support multiple terminals, 48 to 64k bytes of memory, and full real-time, multiprogramming. The high-capacity system offers all the features of the above two, can manage up to 1.8 megabytes of memory, and interacts concurrently in BASIC, HP Assembly, or FORTRAN. A dual density flexible disc is also available.

A two way street

All members of HP's RTE family—RTE-M, and disc-based RTE-II and III—are compatible. RTE designers went to great lengths to ensure that in terms of the programmers' and operators' interface-system prompts, operator commands, programmatic calls, and error messages are identical for all versions of RTE.

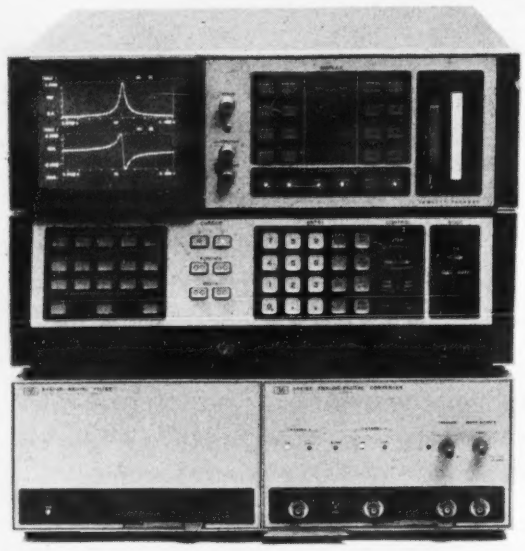
Program statements of the operating system and the file manager are alike; program transportability is assured within the three RTE-M versions. Transporting programs, in either direction, between RTE-M, RTE II, or III requires only minor, if any, changes. It is like a two way street. Upgrading is simple, as is adding multiple small systems supported by a larger program development system.

The U.S. price for RTE-M software is $1750. RTE-M systems range upward from $21,000.

For further information on HP's real-time systems, check D on the reply card.



New & Noteworthy



Can you find the computer in this photograph?

21MX K-Series computer components are being "buried" alive at HP

The Santa Clara, California instrument division integrates the K-Series into its own products because the "K" offers the high processing power and microprogramming capability of 21MX computers in component form, on a single, low-cost board.

The K-Series is at the heart of the HP 5420 digital signal analyzer, which accurately measures signals associated with noise and vibration. HP 5420 applications include analyzing the dynamics of structures from bridges to automobile frames, measuring spacecraft noise levels, and studying aircraft wing vibrations.

With K-Series intelligence, the HP 5420 is totally interactive, allowing users to set up, display, and control all measurements from a clearly defined set of front panel keys. During measurement set up, for example, operators press a key and a menu appears on the screen, listing all possible measurement functions. This assists even inexperienced operators in making the correct measurement selection. Operators spend less time setting up a measurement, and more time analyzing results.

The HP 5420 performs three basic tasks in every measurement application, as described below. Embedded in the HP 5420, the "K" provides the speed, power, and flexibility necessary to accomplish them.

Task one

Sample one or more analog signals and convert them to digital signals.

High direct memory access rates are essential in performing these analog-to-digital conversions. The K-Series is a high-performance, 16 bit minicomputer with a 650 nanosecond cycle time—many times faster than traditional microprocessors. Also, the "K" board's flexibility makes it easy for OEM's to add an extended arithmetic processor board for even faster data manipulation.

Task two

Compute the desired measurements on the signals and store them in memory.

The advanced algorithms critical to these measurements require speed, memory, and computational capability well beyond a simple microprocessor...or even most minicomputers. The "K" board contains a full 24 bit microprocessor with which OEM designers can easily microcode specialized routines into read-only memory, where they can be permanently stored.

Task three

Display results on the CRT screen, plot, or process them further.

Because of the computational capability of the "K," measurement results are shown simultaneously, while the analyzer is still performing fast data acquisition. Further analysis is provided using preprogrammed post-measurement operation, and results can be stored on a removable tape cartridge.

The HP 5420 digital signal analyzer is priced at $29,900. The 21MX K-Series board costs $1475 and can be volume-discounted. (U.S. prices only). **Check E and F on the card if you wish more information.**

Get your HP1000 off to a fast start with RPL

Finally, it's as easy to turn your computer on in the morning and off at night as it is to flip the light switch in your office.

HP 1000 computer systems now have a standard remote program load (RPL) capability which lets users automatically "boot-up" their systems by simply pressing "power-on."

RPL/Auto Boot-Up loads and starts the operating system, and allows complete reloading of user software from disc, magnetic tape, or over a communication line into memory—without once touching the computer's front panel.

With RPL, customers can also develop their own applications for start-up of remote, unattended systems, valuable in distributed processing. **Check G on the reply card for more information.**

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Hewlett-Packard Computer Advances/Nov. 1977

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C. HP Large memory systems	☐	☐
D. HP Real-time systems	☐	☐
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F. HP 21MX K-Series components	☐	☐
G. HP 1000 with RPL	☐	☐

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Tektronix 4025 CRT Turns Alphanumerics to Graphics

BEAVERTON, Ore. — A raster scan CRT terminal which displays alphanumerics but also converts that data into graphics has been introduced by Tektronix, Inc.

The Model 4025 reportedly uses a data storage technique dubbed a "virtual bit map" in which alphanumerics and graphics are referenced in the same display list, but stored separately in read-only memory and random-access memory and random-access memory respectively.

When the terminal's controller scans its display list, it summons the alphanumerics and graphics as needed from their respective memory locations, Tektronix said. This method allows users to scroll alphanumeric and graphics data together on the terminals' CRT screen, according to the company.

Tektronix characterized the 4025 as the first raster scan CRT terminal to integrate alphanumeric and graphics data in this way.

One of the advantages of the virtual bit map technique is that it allows the terminal to make 8.5- by 11-in. hard copies of its alphanumeric and graphics data on a Tektronix 4631 hard-copy unit.

The product also connects to Tektronix's 4662 plotter and to the firm's 4924 digital tape recorder, a spokesman said.

Links to Hosts

Based on a Motorola 6800 microprocessor, the 4025 was designed not as a stand-alone unit, but as an interface to host computers, with which it communicates at 9,600 bit/sec, according to the spokesman. A standard 4025 provides an RS-232 full-duplex interface; an RS-232 half-duplex interface is optional.

The terminal's screen, which consists of a workspace for graphics and a monitor area for user-computer communications, measures 12 in. diagonally and holds 34 lines of text with 80 char./line, Tektronix said.

The standard character set reportedly includes 64 lower case and 96 upper case Ascii characters in an 8 by 14 dot matrix.

The 4025 typically holds a 4K-character display memory expandable to 8K, 16K and 32K characters, the spokesman added. Line frequency ranges from 49- to 61 Hz and power consumption is 295W maximum at 125Vac.

Equipped with a standard typewriter keyboard rather than an Ascii layout, the terminal provides 16 function keys along the top of the keypad and 12 number keys along the side.

In the usual operating mode, the 12 number keys control the 4025's cursor; in the numeric lock mode, they form a numeric pad for data entry, the company said.

Typical keyboard editing functions include line delete, character delete, line insert and character insert.

Software provided with the terminal includes the Plot 10 package, which Tektronix said allows users to turn data files into bar graphs, histograms, line graphs and pie charts.

The 4025 costs $3,595 ($3,307 in OEM quantities) and leases for $189/mo on a one-year contract. Deliveries will begin Nov. 21 from Tektronix's Information Display Group, P.O. Box 500, Beaverton, Ore. 97077.

No Graphics

BEAVERTON, Ore. — Tektronix's 4025 represents just one of two recent additions to the company's 4020 terminal series. The other newly introduced terminal — the 4024 — is identical in most respects to its sister product.

Unlike the 4025, however, the 4024 displays alphanumeric data only, Tektronix explained.

A standard 4024 costs $2,995 ($2,755 in OEM quantities) and leases for $157/mo on a one-year contract.

Data Set Unveiled

ESCONDIDO, Calif. — A multi-speed synchronous data set for local metallic telephone circuits has been announced by the Teleproducts Division of Designed Enclosures, Inc. (DEI).

Designated SDT-I, the unit is strap-selectable to operate at 2,400-, 4,800- and 9,600 bit/sec and 19.2 kbit/sec. It operates over four-wire, full-duplex dc metallic circuits and is reportedly capable of operating at a distance of 15 miles over unloaded cable.

The set costs $395 from DEI at 563 N. Citracado Parkway, Escondido, Calif. 92025.

Datotek Designs Encryption Unit

DALLAS — A portable, self-contained, desktop electronic encryption unit has been announced by Datotek, Inc.

Designated the DC-26, the unit is compatible with the company's recently announced DH-26, a handheld calculator-like enciphering device. With a full-size keyboard and thermal page printer, the DC-26 is said to provide rapid data entry plus hard copy output.

The DC-26 can be used as a central or base-station encryption unit, a spokesman noted.

Operation of the DC-26 requires no special experience, Datotek said.

As the operator keys in the message to be enciphered, the data is first displayed, scrambled in five-character groupings and then printed after the sixth character is entered, the firm said. Text corrections can be made.

Datokek's proprietary key generator is said to provide an almost infinite number of user-selected key variables, making the possibility of unauthorized interception remote.

Display is a 16-segment, LED alphanumeric type. The DC-26 utilizes a thermal 5 by 7 dot matrix printer with a maximum line length of 80 characters and prints 30 char./sec.

The basic unit is priced at $6,800 from Datotek at 13740 Midway Road, Dallas, Texas 75240.

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Users' Report...

"Winning Proposal" Winning Big

A step-by-step guide to proposal preparation is now helping many computer/EDP firms score big wins in their proposal efforts. Users of the book, entitled *How to Create a Winning Proposal*, report an impressive 42% average increase in the success-ratio of their proposal projects. Of the companies polled, 68% attributed their successful track record to the guidelines provided in the book.

Dubbed *"Winning Proposal"* shortly after publication, the much-needed volume has rapidly become an international standard guide for use in both government and commercial proposal efforts requiring a high level of sophistication. It covers the entire proposal process from start to finish . . . giving detailed instructions on contents, structure and methods of preparation for solicited as well as unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases.

". . . a nuts-and-bolts book, functionally prepared for usability as well as readability."

Microwaves Sept. 1976

That "Winning Proposal" is effective in proposal preparation is evidenced by its wide use in GSA, DOD, NASA and the military . . . as well as in varying sizes of national and multi-national corporations. For many project managers, it is a virtual lemonade-stand in the Sahara because of the valuable assistance it provides. All agree that the most outstanding feature of the book is usability. It enables the user to actually plan, write and submit a superior proposal with a high win probability.

". . . a complete guide to planning, writing and submitting a winning proposal."

Convair Managair Feb. 1977

The authors cover government requirements in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its effectiveness in competing for contracts. Excellent guidelines are given on how to analyze and respond to RFP's, RFQ's and IFB's. Simplified formulas enable accurate costing-out of engineering, R&D, service, manufacturing and production projects.

Copies of *How to Create a Winning Proposal* are available pre-paid from Mercury Communications, Inc. 730-G Mission St., Santa Cruz, CA 95060. $65 includes 3-5 day delivery inside the U.S. In California add $3.90 tax. For outside the U.S., $76 (int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

From Facsimile to Conferencing

Diversity of Electronic Mail Systems Examined

By Ronald A. Frank
CW Staff

LOS ANGELES — Electronic mail systems are already feasible from a technological standpoint and several of these systems are already in operation, according to panelists at the Interface West conference here recently.

Einar Stefferud, president of Network Management Associates, Inc. said electronic mail is used to define a variety of systems. The term is applied to networks ranging from facsimile systems up to full computerized conferencing systems.

Facsimile systems are analog connections and include terminal-to-terminal communications. They allow picture image transmission and the sending of signatures, but electronic retention of the information is difficult.

Direct-wire teletypewriter systems are digital and add character code transmission. But these cannot transmit drawings or pictures and they require keyboarding and printing in order to be readable. Electronic retention is also difficult, he said.

Teletypewriter message-switching systems are next in order of sophistication and these feature store-and forward transmission of messages from terminal to terminal. These also require keyboarding and printing, but electronic retention of the information is still difficult.

A step more advanced are computer message systems using time-sharing systems connected to remote CPUs. These allow intracomputer file-to-file text transfers so long as the sender and receiver terminals are connected to the same CPU, Stefferud said. These systems require training, specialized equipment and software but they introduce the concept of computer processing of messages.

Computer network message systems operate within a network of computers and allow intercomputer file-to-file text transfers. These also have a requirement for training users and need specialized equipment and software. However, they add the dimension of a large connected community, he said.

Conferencing Systems

The most sophisticated electronic mail systems are the computer conferencing systems that have common shared message file access. These support group discussions but also require user training, Stefferud noted.

An example of the latter type of system has been operating on the Arpanet for some time. Called Message Group, this informal teleconference was designed to explore the potentials for computerized message systems in addition to defining what form these should take.

Experience with this system has determined that electronic mail systems can be broken down into four basic categories, Stefferud said. The first is concerned with preparation and modification of the information.

Next, the question of packaging and delivery of the text must be examined. This involves building an envelope structure within which the transmitted information can travel. This category is also concerned with information addressing and includes the creation of electronic mailboxes for conference participants.

Packaging and delivery also includes provision for the transmission of data and failure indications when information is not sent correctly. In cases of network malfunction, rerouting must also be provided for.

On the receiving end, there has been a difference of opinion on the need for acknowledgement of messages, Stefferud said. Some believe that this is necessary for participants to know that a message has been received by a certain party, but others feel that an acknowledgement implies a need for an answer and thus is not necessary.

CW at Interface

Authentication of messages as being from authorized parties has been a controversial issue as well as whether or not a public archive of transmitted messages should be established. If such an archive is kept, the question of ownership of the information will also have to be studied, he said.

The third category is concerned with filing and retrieval of messages and includes file sharing and purging if that is to be a goal. The fourth category leads to the creation of data banks although these are not technically part of the electronic mail problem directly, Stefferud said.

In response to a question from an attendee, Stefferud admitted that the question of security had been left off the list. In general, it is often more important to know that the system has been compromised rather than to try to prevent it from happening. If a compromise is discovered, measures can be taken to minimize its impact, he explained.

Experience with electronic mail systems proves that there is still a need for human interaction, however, Stefferud said. In cases where there have been serious disagreements between electronic mail participants, it is not unusual for someone to pick up the phone and talk directly to the other party out of sheer frustration, he said.

Often, text loses the marginal contexts that can only be captured during actual voice conversations. When this occurs, the parties may actually experience a divergence of understanding that can ony be solved by talking directly, he explained.

Several attendees asked when electronic mail systems will become more widely available. The heart of the issue is a need for timely man- or machine-readable communications, according to Robert Field, vice-president of Tymnet, Inc.

The On Tyme service introduced by Tymnet allows terminal-to-terminal communication of messages on his company's network, he said. The service transmits 500- to 1,000-word messages for between 20 cents and 80 cents depending on terminal type and geographic location, he said.

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Citibank Reported Running Private Packet Net

By Ronald A. Frank
CW Staff

LOS ANGELES — A private packet-switched network has been put into operation by Citibank in New York, according to Seymour Ratner, assistant vice-president.

Speaking at a session on data switching networks at the recent Interface West conference here, Ratner said the packet net is called Citinet and is based on technology used in the Arpanet.

Citinet has been operational since March and is presently being used for management information systems applications connecting various mini-based systems developed by the bank. Ratner said that he could not disclose the number of processors operating on the packet net but that included are minicomputers from Honeywell Information Systems, Digital Equipment Corp., and Interdata Corp.

Software for Citinet was developed with support from Bolt Beranek and Newman, which developed Arpanet software for the Department of Defense. Although much of the Arpanet software is in the public domain, some modifications were made to handle the Citinet operations.

The private packet net uses an RS-232 electrical interface together with character-stuffing (instead of bit-stuffing) principles, and its link protocol is based on the Higher-Level Data Link Control (HDLC) format found in the CCITT X.25 standard. Some changes were made to the HDLC protocol for Citinet, Ratner said.

Current Use

At present, the packet net is being used only for host-to-host data transfers, but terminal-to-host and terminal-to-terminal capabilities are being considered, he added.

Using the minicomputers, it cost about $25,000 to add a new processor node to the network compared with much higher costs in other packet nets such as Arpanet where the packet technology was developed. Software interfacing to support a specific type of minicomputer on Citinet costs about $75,000 per machine type, Ratner said.

Session chairman Ralph Berglund, a consultant, said the Citinet is typical of the way in which private networks will apply the virtual circuit switching techniques now emerging. These nets will extend the distributed data base and distributed processing concepts to allow multiple terminal and multiple host communications, he said.

The recent CCITT adoption of X.25 will lead to "substantial international development of an expansion of public virtual-switched circuit networks in the coming years," according to Berglund, and as evidence he cited IBM's introduction of an X.25 interface for the 3270 CRT system for the Datapac network in Canada and the Transpac network in France.

Vendor's network architecture such as IBM's Systems Network Architecture, DEC's Digital Network Architecture and Univac's Distributed Communications Architecture — should be related to the public data networks, Berglund said. Both the public nets and the architectures are part of a new era in virtual circuit switching systems, he noted.

Although most of the announced network architectures are designed for virtual circuit switching, the NCR Distributed Network Architecture "seems to provide for both virtual circuit and datagram interfaces," he said.

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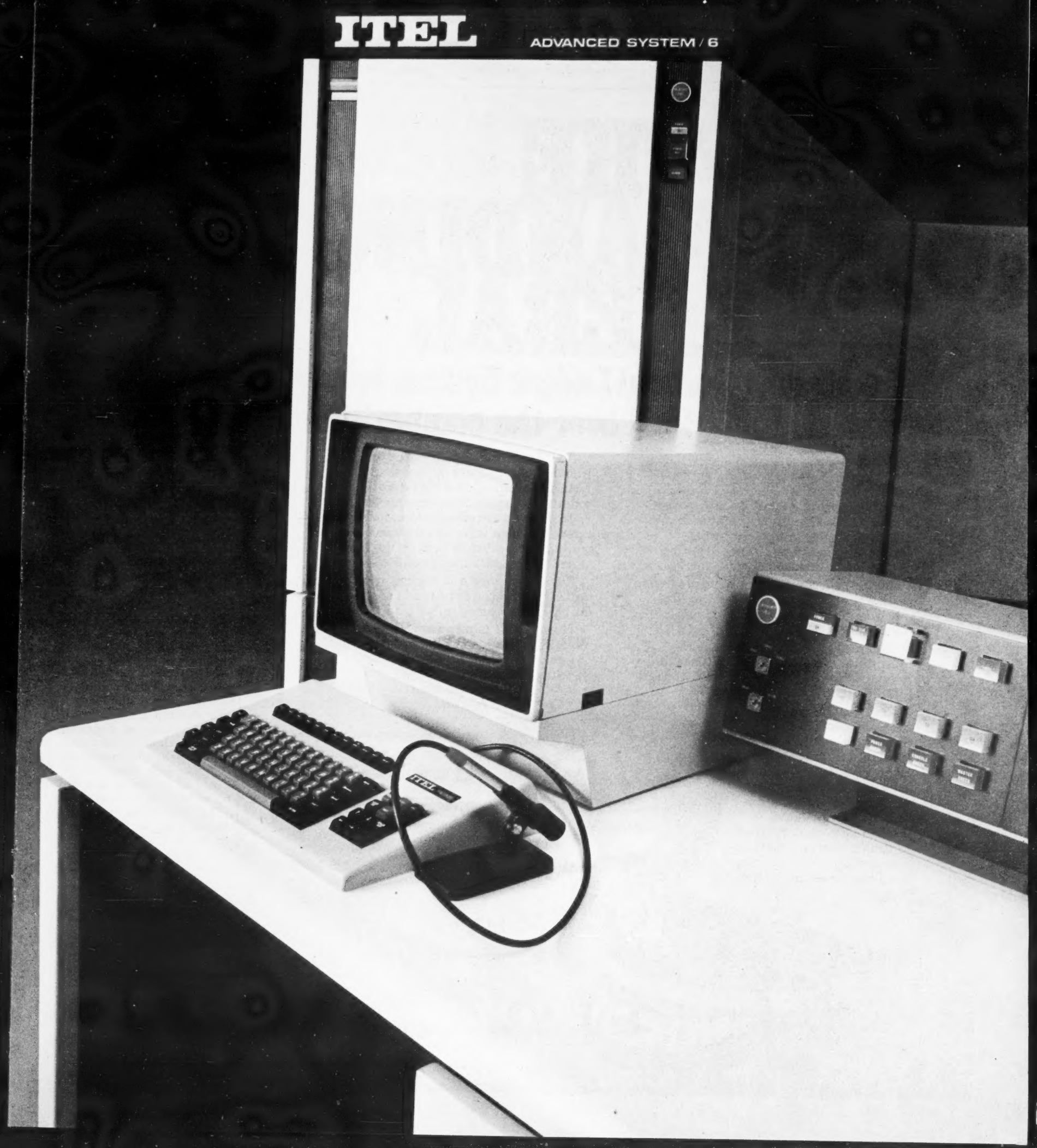
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To Improve Net Monitoring

Human Factors Held Vital to Control Centers

LOS ANGELES — Human factors are an important part of a technical control center designed to monitor the performance of data communications networks, according to John Nuwer, supervisor of data transmission for Atlantic Richfield Co. (Arco).

Describing the switched private coast-to-coast network operated by Arco in the continental U.S. and Alaska, Nuwer said that the carrier must take responsibility for network diagnostics and maintenance.

Technical control centers must not be built on such a complex level that they exceed the capabilities of the people that will be monitoring and staffing them, he said.

In this regard, it is often wise to make a distinction between the information needed by the computer operators and that needed by the communications maintenance people. Computer operators are only interested in knowing whether a terminal is in operation and they don't need technical equipment to monitor such parameters as phase jitter.

Patch panels that allow individual lines to be monitored should be installed in technical control centers, where communications technicians can monitor exactly what is happening on a particular line, Nuwer said.

Interface Monitor Portable

PROVIDENCE, R.I. — A portable, rechargeable version of the Model 60 EIA interface monitor and breakout panel is being offered by International Data Sciences, Inc.

Featuring two AA nickel-cadmium batteries that allow the unit to operate from 110 VAC while the batteries are being charged, the test set provides access to all 25 conductors of the EIA RS-232 interface, the firm said.

Twelve LEDs monitor signals and two LEDs sense whether signals meet EIA specifications, according to a spokesman.

Twenty-four switches allow all interface conductors except frame ground to be individually interrupted, allowing isolated testing and observation of terminal and modem signals, he said.

The unit sells for $250 from International Data Sciences, Inc., 100 Nashua St., Providence, R.I. 02904.

CRT Aids Development

PHOENIX — A CRT terminal designed for use with the Exorciser development system was unveiled by Motorola Semiconductor Products, Inc.

The Exoterm 100 provides communications through a keyboard at rates up to 9,600 bit/sec. A video display that uses a 12-in. diagonal CRT provides response within 24 lines of up to 80 characters each, it was reported. All activities are coordinated by a micro-executive module in conjunction with various control and application modules.

Efficiency is enhanced by 12 function keys that are reportedly encoded to directly invoke functions to the Exorciser at each of its three command levels. Communication between the terminal and the Exorciser system is provided by an RS-232C interface.

The price of the terminal is $2,200 from Motorola Semiconductor Products, Inc., P.O. Box 20294, Phoenix, Ariz. 85036.

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Self-Study Program Teaches Data Entry Skills

MINNEAPOLIS — A self-study multimedia course that teaches data entry skills to key-entry operators is available from Data 100 Corp.

The course consists of two audiotapes, an administrator's guide, an operator's guide and a reference guide. It covers operations of both the company's Keybatch key-to-disk and Model 77 key-to-diskette systems.

Operators can go through a series of audiotape lessons, workbook activities, hands-on exercises and self-evaluation procedures at their own speed. The entire process takes six to eight hours, Data 100 said.

The course is priced at $148 from Data 100 at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

Floor Mat From 3M Drains Static Charges From Personnel

ST. PAUL, Minn.— An electrically conductive floor mat which drains static charges from office personnel has been introduced by the 3M Co.

The Velostate forms an "island of protection" around computers and electronic office equipment, preventing loss of data and alteration of memory, the firm said.

Each mat comes in three sizes: 24- by 32 in., 4- by 5 ft. and 4-by 8 ft. They cost $30, $95 and $105 respectively from 3M at P.O. Box 33600, 3M Center, St. Paul, Minn. 55133.

Graphics Meet Set

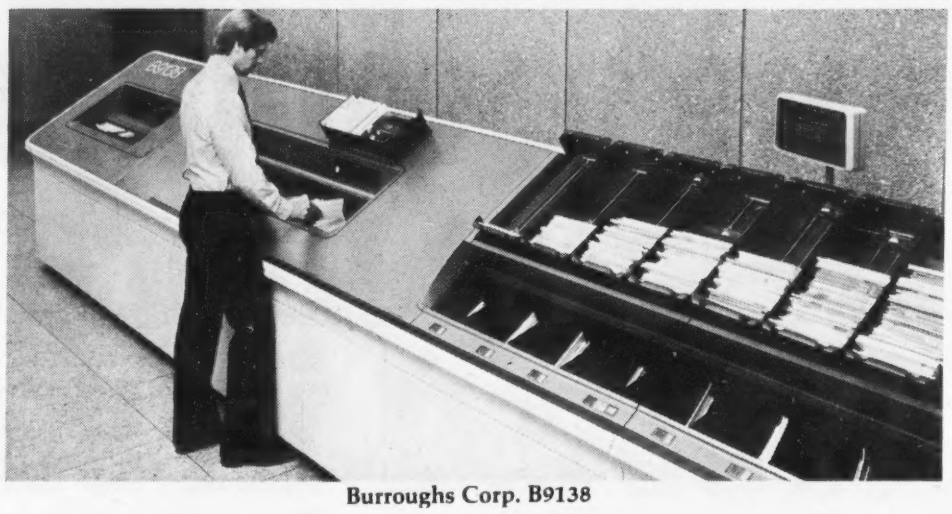
WAUWATOSA, Wis. — Jerusalem Systems here has announced a computer graphics seminar to be held Dec. 14 and 15 in Milwaukee.

Computer Graphics '77 will be run on four tracks, covering the industrial, business, government and utility computer graphics applications.

The cost of the seminar is $400 from the firm at 12201 W. Burleigh Road, Wauwatosa, Wis. 53222.

Correction

Media Recovery, Inc.'s automatic impact detectors [CW, Oct. 24] cost $6 in quantities of one to 12. The $2.50 price applies to OEM quantities of 100,000 or more.



Burroughs Corp. B9138

Micr Reader/Sorter Processes 2,600 Check/Min in One Pass

DETROIT — A magnetic ink character recognition (Micr) document reader/sorter that reportedly can process 2,600 standard checks per minute and 131,000 encoded forms of mixed sizes in an hour has been introduced by Burroughs Corp.

The B9138 can read, endorse, microfilm and sort Micr-encoded documents in a single pass, the firm said. The system functions on-line under control of a central computer or off-line with its own internally stored programs, a spokesman noted.

On-line, the B9138 can be used with a B2800 or larger member of the Burroughs 800 family or with B3700 and larger computers in the 700 series.

The unit can be equipped with four to 32 sorting pockets in four pocket modules; each pocket is capable of holding up to 950 documents, the spokesman said. The system has 16,000 bytes of user memory expandable to 44,000 bytes.

Document-processing programs are loaded into the B9138 memory through its own 243,000-byte minidisk. Programs can be created, however, from the console keyboard, Burroughs said.

System features include bulk filing to facilitate retrieval, a built-in "jogging" mechanism for document alignment, electronic image tracking and double reading of each character.

System-to-operator messages in English and corrective-action instructions appear on the control console and on swivel-mounted

(Continued on Page 60)

DP Insurance Can Be Tailored

SAN FRANCISCO — Fireman's Fund Insurance Co. is offering a DP policy it said can be tailored by users to suit their operations.

The policy offers "all-risk" coverage for physical damage to equipment and tapes, cards and other forms of media. It also offers business interruption and extra expense coverage, Fireman's said.

This makes it possible to adjust the DP policy to the needs of those users with only a few terminals as well as those with more elaborate computer installations, a spokesman explained.

Physical damage coverage can be either on an actual cash value or on a replacement cost basis, he added. Separate limits can be established for owned, rented and leased equipment.

Coverage also includes dishonest, fraudulent or criminal acts of employees, he noted.

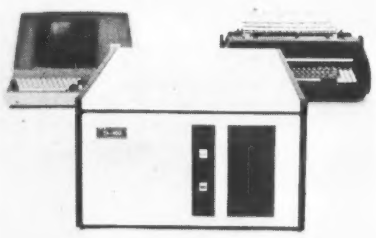
Extra expense coverage includes indemnification for use of outside DP equipment, additional payroll, emergency supplies and rental. The actual amount of loss less the deductible is paid at the policyholder's option.

Information about the DP policy can be obtained from Fireman's Fund at P.O. Box 3395, San Francisco, Calif. 94119.

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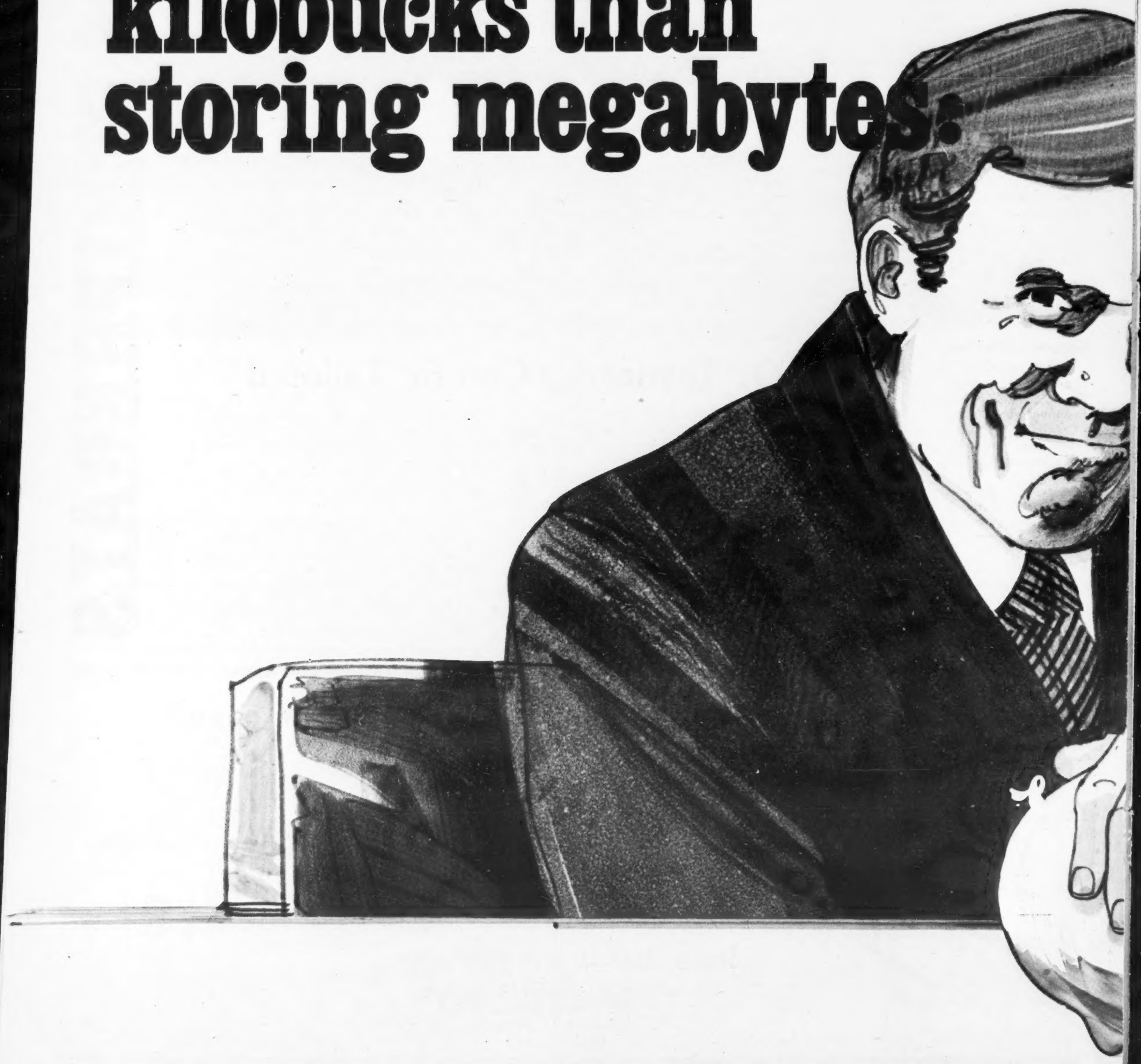


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Systems Offer Continuous Measurement

McLEAN, Va. — A series of performance management systems that are said to continuously measure system profile, buffer hits and misses, and millions of instructions per second (Mips) on IBM 370/168, Amdahl Corp. 470V/6 and Univac 1110 computers has been announced by Tesdata Systems Corp.

Composed of five models (the MS-58C, MS-88A, MS-88B, MS-88C and MS-88D), the Alpha systems provide continuous measurement through real-time displays and report generation as system abnormalities occur, according to a spokesman.

This continuous measurement concept also provides an additional dimension to multisystem and/or decentralized data processing users through the availability of Distributed Measurement Networks.

These systems may be geographically disbursed and connected through standard communications interfaces to provide a centralized base of performance information.

Each Alpha system also operates on a foreground/-background principle via the Tesdata disk operating system. Performance measurements are stored on a disk in the foreground, while system planning and trend reports are generated in the background.

An Alpha MS-88D with a 144-sensor data collection system can monitor the number of bytes transferred on all the previously mentioned CPUs, all channels and/or all devices as well as bytes transferred on up to 16 transmission lines including line retrieve and polling measures.

The Alpha series systems, including all support, training, documentation and software, range in price from $115,000 to $178,000, Tesdata said from 7900 Westpark Drive, McLean, Va. 22101.

Biomation Introduces Portable Logic Analyzer

CUPERTINO, Calif. — Biomation Corp. has introduced a portable logic analyzer that is said to be suited for the individual engineer's use in equipment design and for use in field testing by service personnel.

The 9-channel Biomation 920-D plugs into any available oscilloscope or CRT, a spokesman noted.

Other features include an auxiliary channel, a clock or event trigger delay, a 20 MHz record rate, combinational triggering and a 10 nsec "glitch" detection feature.

The unit's memory capacity is 9 bits by 256 words, using static random-access memory (RAM), the spokesman said.

The auxiliary channel can be used to record data as a conventional signal input channel for subsequent display; to mark and qualify trigger points; and to qualify the external clock input.

The unit records in two modes; one records until a trigger event is hit, the other records until a preset time after the event.

The unit stores both pretrigger and post-trigger data.

The 920-D is available for $1,295. Biomation Corp. is located at 10411 Bubb Road, Cupertino, Calif. 95014.

OCR-A Imprinter Available

PHILADELPHIA — Soabar, Inc. has introduced an OCR-A imprinter, the Model 341, which features a dial-set band head designed for quick copy changes and machine setup.

The machine's printband head permits dial setting of copy in either optical character recognition (OCR) characters, conventional characters or a combination. It provides four dial-set bands of copy maintaining up to 10 band/line, a spokesman said.

The Model 341 also incorporates a slide-in magnetic chase to hold metal-based, rubber mats for the imprinting of repetitive copy such as size, color and style.

Other features include a three-roller inking system, a positive feeding mechanism, two feed fingers, a self-stop counter and a flexible lamp for visibility when setting copy on the printband head.

The units sells for approximately $4,200 from Soabar at 7722 Dungan Road, Philadelphia, Pa. 19111.

NCS Brings Out Optical Mark Reader/Recorder

MINNEAPOLIS — National Computer Systems, Inc. (NCS) has introduced an optical mark recorder/-reader designed for commercial and governmental use.

The Sentry 7005 can read and record nearly 7 million items of information from 2,400 reponse sheets every hour, NCS said. Because it eliminates the entire keypunch operation, the system can save data entry and processing time and money, a spokesman claimed.

The 7005, which features self-calibrating read heads and an automatic deskewing mechanism, handles a variety of forms, the spokesman added.

The recorder/reader is available in both stand-alone and on-line models. The on-line version feeds information directly to a host mainframe; the stand-alone model puts the information onto a standard reel-to-reel tape for future processing.

Options include a sorter that selects mismarked response sheets and a printer that encodes or abstracts information.

The Sentry 7005 is available for $49,500 from NCS' Equipment Division, 4401 W. 75th St., Minneapolis, Minn. 55435.

Micr Unit Out

(Continued from Page 57)

CRTs, with one CRT for each group of eight sorting pockets.

Visual indicators on the pocket stackers guide the operator in recovering a jam or missort, the firm said.

Purchase prices for the B9138 range from $226,500 for a basic four-pocket system to $593,700 for a 32-pocket system equipped with an ink-jet endorser and a microfilming module. The system will be available in the fourth quarter of 1978, Burroughs said from headquarters in Detroit, Mich. 48232.

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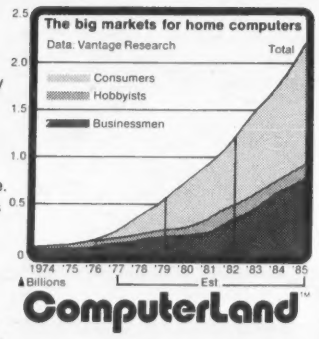
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NMA Publishes COM Resources

SILVER SPRING, Md. — The National Micrographics Association (NMA) has expanded its offerings with the printing of four publications.

All About Microfilm Cameras covers the elementary principles of photography and film, microfilm facts and terms, microfilm cameras and accessories and maintenance of cameras. The 28-page booklet, designated CS6, is available for $2 per copy.

The *1977 Supplement to the Guide to Micrographic Equipment* covers computer output microfilm (COM) equipment introduced since the last supplement was published in 1976. The publication is designated RS23-1977 and sells for $14 to NMA members and $17 to nonmembers.

Basic Microfilm Standards, MS115-1977, deals with Internal Revenue Service standards which cover the microfilming of general books of account. Actually a collection, this publication sells for $8.50 to NMA members and $11 to nonmembers.

The *British Standard Specification for Microfilm Readers* specifies the characteristics of reading apparatus for microfiche and for microfilm in roll form, filmstrips, aperture cards and jackets. Included with the standard is a high resolution test fiche with 3,360 chart images at a reduction of 100X.

The package, BS 4191, is available at $18.50. The test microfiche alone, designated BS4191C, costs $12.50.

All publications can be ordered from NMA Publication Sales, 8728 Colesville Road, Silver Springs, Md. 20910.

Zeta Cuts Cost Of Drum Plotters

LAFAYETTE, Calif. — Price reductions ranging up to 19% on its 12-in. drum plotters has been announced by Zeta Research.

Previously $4,950, the Model 1200 now costs $4,000. The Model 230, formerly $5,950, is now priced at $4,950.

The models 150, 160 and 170 now cost $3,650 compared with the old price of $3,950.

Zeta Research is located at 1043 Stuart St., Lafayette, Calif. 94549.

Kwik-File Has Storage Trays

MINNEAPOLIS — A line of file trays that can accommodate microfiche, tab cards, reports and statements has been introduced by Kwik-File.

Priced at $21.95 for the 4-in. size and $28.95 for a 12-in. model, the trays are available from Kwik-File, 2845 Harriet Ave. South, Minneapolis, Minn. 55408.

Formex Has Grid Paper

TEANECK, N.J. — Formex, Inc. has introduced continuous program grid paper.

The grids provide a visible guide of the printing positions that are being used in various programs. The grids are spaced for 6 line/in. and 10 char/in.

The paper sells for $84 a carton and quantity discounts are available, the firm said from 101 Cedar Lane, Teaneck, N.J. 07666.

Light Pens Bow

LOS ANGELES, Calif. — Two solid-state light pens, the LP-210 and the LP-211, have been introduced by Information Control Corp.

Each light pen is 6 in. long and weighs 2 oz.; each features a satin chrome finish and a retractable 48-in. cord, according to the company.

The LP-210 has a "Touch-Sense" actuator tip which is activated when the operator's index finger touches the pen's barrel. The LP-211 is fitted with a push-actuation tip that is enabled by pushing against the CRT faceplate, the firm said.

Prices for the LP-210 start at $450 and $475 for the LP-211, International Control said from 9610 Bellanca Ave., Los Angeles, Calif. 90045.

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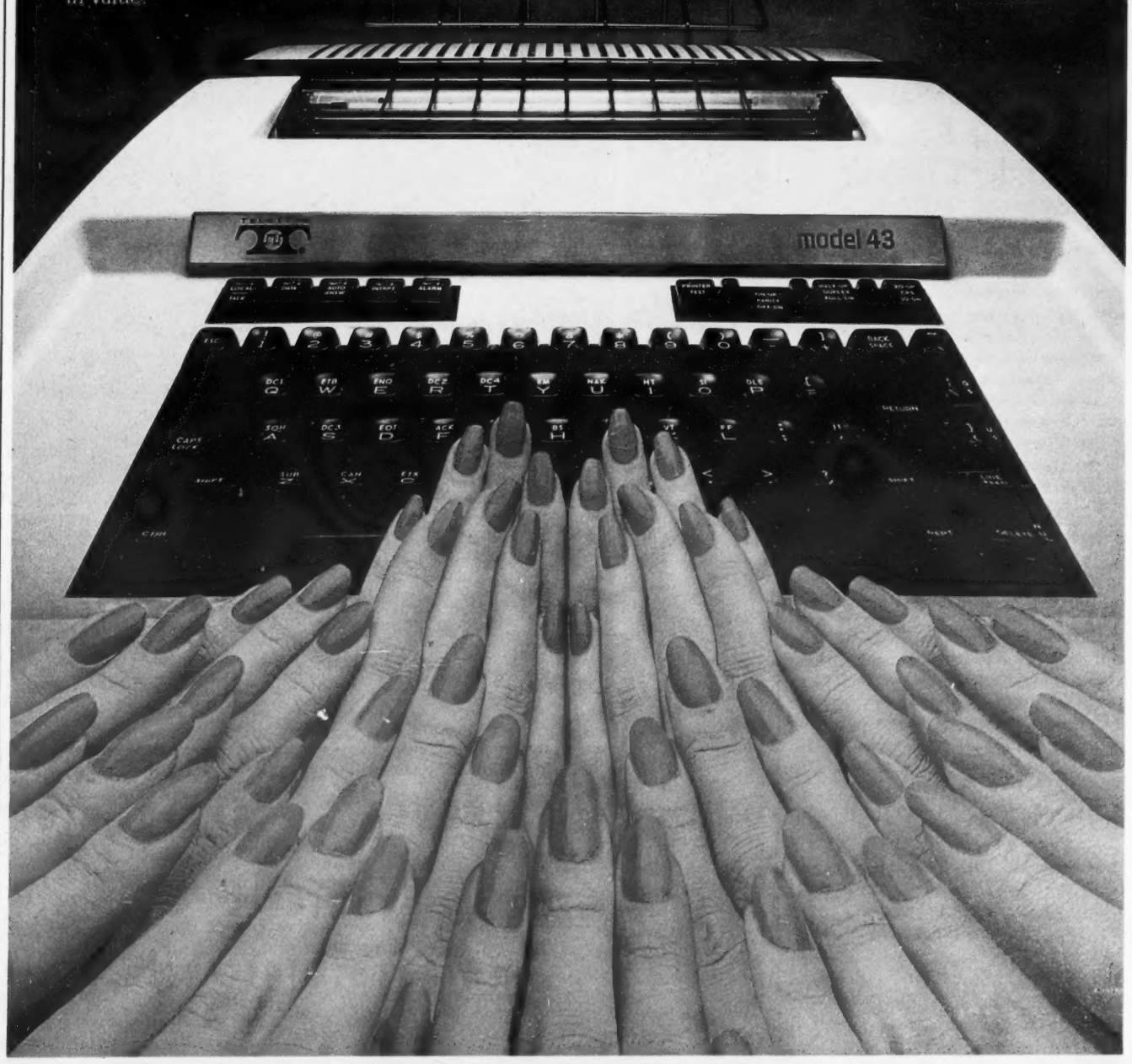
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Office Services Courses Set

NEW YORK — The American Management Associations (AMA) will offer two courses, "Organization and Management of the Office Services Function" and "Managing Word Processing as an Office System."

The first seminar, lasting 2 1/2 - days will be open to 15 participants only and will cover such topics as choosing office equipment, controlling office supplies, in-house publications and getting the most for your communication dollars, a spokesman said. It will be held in New York on Nov. 21-23, in San Francisco on January 16-18, and in Denver on April 10-12.

"Managing Word Processing as an Office System," a three-day course, will involve a step-by-step approach to planning, implementing and managing a word processing center. It will be held in New York on Nov. 21-23.

Registration fee for the first course will be $375 for association members and $430 for nonmembers. The second course will cost $425 for members and $490 for nonmembers.

For further information, contact the American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Proxies Handled By OCR System

SPOKANE, Wash. — An optical character recognition (OCR) system that reportedly processes proxy cards automatically without presorting or punch-card preparation was introduced by the Key Tronic Corp.

The Proxyscan, fitted with special optical filters and increased illumination, can process proxy documents without restricting the types of marking implements to be used. The reading speed of the unit is 200 char./sec with an average throughput of 4,000 document/hr.

Documents may range in length from 2.5 in. to 8.75 in. and in height from 1 in. to 6 in. Shareholder identification number, issue number, the presence of one or two signatures, and up to 16 yes or no votes can be extracted in one pass, a spokesman said.

The Proxyscan consists of an automatic feeder, dual horizontal data reader, sort pocket, an M9 recognition unit and an interface.

The unit sells for $31,634. Key Tronics can be reached through P.O. Box 14687, Spokane, Wash. 99214.

Microfiche Reader Fits Under Counter

MENOMONEE FALLS, Wis. — Data View, Inc. introduced a "works-under-a-counter" microfiche reader, dubbed the Data View Cube, which it said was developed to streamline the micrographics user's environment.

The cube is designed to be able to drop into a desk teller station or any other workstation where the operator must be an integral part of the system, according to the firm.

The display screen comes in blue, green or gray and is available for under $1,500 from Data View, Inc., P.O. Box 537, Menomonee Falls, Wis. 53051.

Datagraphix Raises Fiche Recorder Cost

SAN DIEGO, Calif. — Datagraphix, Inc. has announced that the price of its standard off-line Autocom microfiche recorder will be increased 12% to $57,500, effective Dec. 1.

The price hike is the result of an increasing emphasis on new software and hardware flexibility by the firm, according to a spokesman.

Minidiskette Bins Hold 50 or 100 Units

NEW YORK — A storage and retrieval bin for minidiskettes has been introduced by Printcraft Systems, Inc.

Available in either a 50- or 100-capacity size, it sells for $22.50 and $25.50 respectively from Printcraft Systems, Inc., 11-17 Beach St., New York, N.Y. 10013.

Eotec Unwraps Line Monitor

SANTA CLARA, Calif. — An additional model of the TT-101 line monitor was announced by the Eotec Corp. here.

The Model II reportedly features technical advances over the previous model such as a 256-char. display with auto or manual modes; a wideband monitoring capability; serial transistor-transistor logic (TTL) interface; a logic recorder with an electronic strip chart display; high-speed operation up to 500Kbytes; auto polling and 801 auto call interface monitoring.

Prices of the basic unit, with all factory-supplied and loaded routines, start at $8,100 from the Eotec Corp., 2595 Martin Ave., Santa Clara, Calif. 95050.

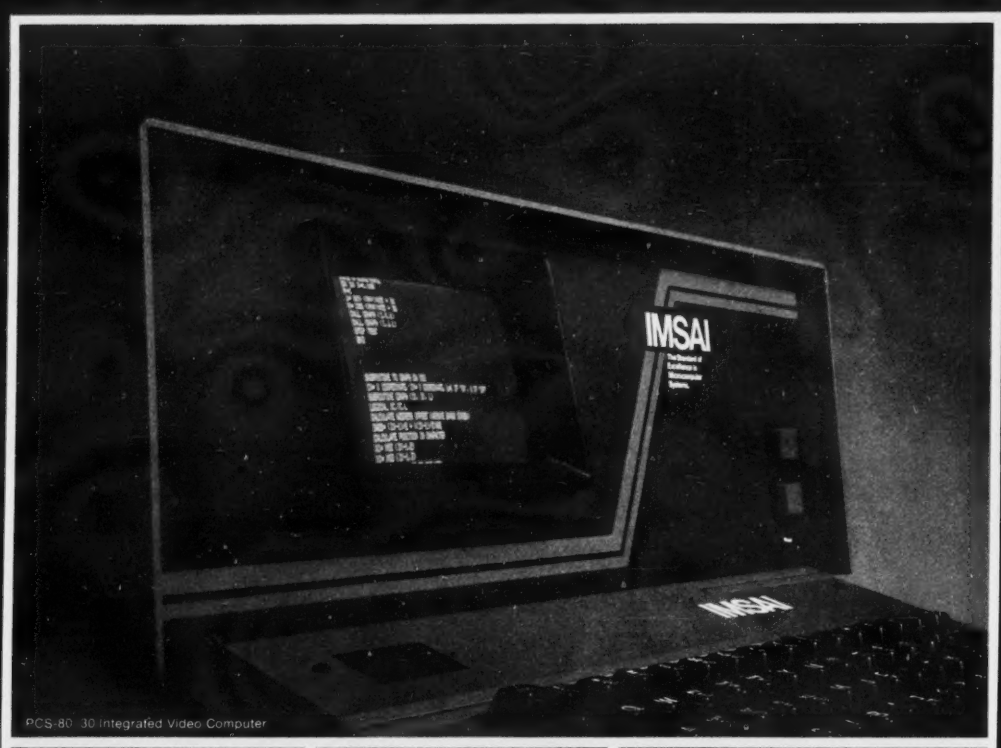
Powering Up

POMONA, Calif. — A switching power supply, designed for high energy consuming equipment, was introduced by Electro-Module, Inc.

The PEX 058-00 is reportedly suited for computer mainframes and peripherals as well as for communication and process control applications. It has an input voltage of 115/230 VAC single phase and a transient response time of .5 msec, the firm said. Its single adjustable output is from 4.75V to 5.25V with current limit and overvoltage protection.

The unit, weighing 36 lbs., is priced at $925 from Electro-Module, Inc., 2855 Metropolitan Place, Pomona, Calif.

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PCS-80/15 (w/IKB-1)


PCS-80/30, 80-25A, DHMO


PCS-80/ Components

IMSAI introduces the PCS-80 component system...

Switcher Bows

MIDDLETOWN, N.Y. — Multiple 60- and 415 Hz frequency converters can be switched between any number of IBM 3033, 370/168 and Amdahl Corp. mainframes with a unit that is available from KW Control Systems, Inc., according to the vendor.

The Matrix Switching Unit will allow frequency converters manufactured by different vendors to be incorporated into a large system, the firm claimed.

The output of the switch can reportedly supply 415 Hz power to the mainframes, allowing isolation between them.

The unit costs $12,000 from KW at R.D. No. 4, 114C, S. Plank Road, Middletown, N.Y. 10940.

Compuscan OCR System Uses Smart CRT

TETERBORO, N.J. — An optical character recognition (OCR) system with an intelligent CRT terminal has been introduced by Compuscan, Inc.

The Alphaterm can handle typed and keyed text and/or forms input. It provides output interfaces to paper tape and magnetic tape units as well as phototypesetters and modems.

The system also operates on-line to computers, the firm said.

Control of the system is through the CRT keyboard, which is used for editing, reformatting, displaying errors, entering parameters and displaying I/O on a horizontally split screen.

The software package provided with the initial units will be oriented to telecommunications applications; subsequent units will have software designed for graphics arts and word-processing functions, a spokesman noted.

The Alphaterm system sells for $58,000. Retrofitting to current Alpha and Alphacomm configurations costs $3,000 to $5,000. Compuscan is at 900 Huyler St., Teterboro, N.J. 07608.

TDC 2000 Gains Features

FORT WASHINGTON, Pa. — Honeywell, Inc.'s Process Control Division has enhanced its TDC 2000 process control system.

The enhancements include historical and real-time recording; alarm annunciation and displays; logging; CRT and keyboard interfaces to intelligent multiplexers; digital start/stop operations; and system security.

The latter is a Honeywell development called Uninterrupted Automatic Control (UAC). It automatically detects the malfunction of one to eight basic controllers, notifies the operator, switches in a reserve controller and resumes control of the process in less than 1 sec, Honeywell claimed.

All system additions were designed for use with circuits that plug into existing connectors, making it possible to update installed systems without extensive downtime, according to a division spokesman. The division is at 1100 Virginia Drive, Fort Washington, Pa. 19034.

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□ **Price assembled $1499.** IMSAI is the only S-100 bus manufacturer that offers a microprocessor driven keyboard with "N" key roll over, 2¼K of RAM, 8 expansion slots, choice of 4K, 16K, 32K and 64K RAM expansion boards, 3K ROM monitor, synch/asynch serial interfaces, parallel and serial ports, high resolution CRT monitor, 24 x 80 display with graphic editing and data entry features, and 28 amp power supply for the incredibly low price of $1499.

□ **mpu Speed.** IMSAI is the only S-100 bus manufacturer that offers true 8080 compatibility, operating at 3 mHz.

□ **RAM Included.** 2¼K.

□ **Expansion Slots.** Eight expansion slots are provided in a new terminated and regulated motherboard (10 slots total).

□ **RAM Board Sizes.** IMSAI is the only S-100 bus manufacturer to supply 4K, 16K, 32K, and 64K RAM memory expansion boards.

□ **ROM Monitor.** IMSAI is the only S-100 bus manufacturer to provide 3K of ROM.

□ **Asynch/Synch.** Only one other S-100 bus manufacturer provides both methods of data communication.

□ **PIO/SIO.** IMSAI is the only S-100 bus manufacturer that provides two serial ports and one fully implemented parallel port at no extra charge.

□ **Video I/O.** IMSAI is the only S-100 bus manufacturer to include a high resolution (14 mHz) monitor as an integrated part of the computer.

□ **CRT Format.** IMSAI is the only S-100 bus manufacturer to provide a full 24 x 80 screen, which is two times the capacity of the common 16 x 64 screen.

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Options: IMSAI is the only S-100 bus manufacturer to provide a comprehensive array of fully integrated options including: line and character printers, CRT terminals, intelligent keyboard, ACR storage, standard and mini floppies, TTY BASIC with OS, 4K, 8K and 12K BASIC, audio cassette BASIC with OS, 8K disk operating system (DOS) based upon CP/M,* scientifically and commercially oriented disc BASIC and level 2 FORTRAN IV compiler.

□ **Printers.** Only one other S-100 bus manufacturer can supply both line and character printers.

□ **CRT/Keyboard.** IMSAI is the only S-100 bus manufacturer to provide both CRT terminal and intelligent keyboard as separate options.

□ **ACR Storage.** Available.

□ **Floppies.** IMSAI is one of the few S-100 bus manufacturers to provide both standard and mini floppies and the only S-100 bus manufacturer that supplies double density standard floppies.

□ **TTY BASIC.** IMSAI is one of the few S-100 bus manufacturers that provides self-contained operating systems with 4K, 8K and 12K BASIC.

□ **ACR BASIC.** IMSAI supports ACR BASIC with an 8K version.

□ **DOS.** IMSAI is the only S-100 bus manufacturer to provide an enhanced version of the control program monitor (CP/M*) that can support up to 18 disk drives.

□ **Disc BASIC.** IMSAI is the only S-100 bus manufacturer that provides both scientific and commercial versions of compiler oriented BASIC.

□ **FORTRAN IV.** IMSAI is the only S-100 bus manufacturer that offers a level 2 FORTRAN IV compiler that operates under an enhanced version of CP/M.*

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Distributed DP Topic of Course

NEW YORK — A four-day seminar, dealing with distributed systems will be held here beginning Nov. 28 by the American Management Associations (AMA).

The course will cover the various aspects of processing and storing data at two or more sites, according to a spokesman. It will focus not only on the potential and probable benefits of a distributed system, but also discuss how such systems have changed the role of the manager; the problems of equipment selection, maintenance and implementation; and system security.

The problems involved in planning a distributed system will also be discussed. Such variables as design options, competing product claims and product availability will be covered.

The course was designed for technical management personnel, DP managers, analysts, designers, administrators and others involved with distributed systems.

The November course will be held at AMA headquarters in New York. It will also be given on Jan. 9 in Los Angeles, Jan. 30 again in New York and on March 27 in Chicago.

Registration fees are $490 for AMA members and $565 for nonmembers. With team discounts for three or more people from the same company, the fees are $420 for AMA members and $480 for nonmembers.

AMA headquarters are at 135 W. 50th St., New York, N.Y. 10020.

Contract Course Set

WASHINGTON, D.C. — A three-day course designed to explore the subject of contracting for services with the government will be held here Dec. 14-16 by Federal Publications, Inc.

"Contracting for Services" will initiate the participant into the area of government contract procurement while stressing both practical and legal considerations, according to a spokesman.

Topics covered will include "Foundations of Service Contracting," "Competing for Service Contracts," "Labor Requirements" and "Costs and Prices."

The registration fee is $425. Federal Publications is at Suite 500, 1725 K St. N.W., Washington, D.C. 20006.

Donkey Exercises Peripherals, Aids Testing, Repairs

KING OF PRUSSIA, Pa. — A portable, programmable test-and-excercise instrument designed for troubleshooting, repairing and testing computer peripherals has been introduced by Sorbus, Inc.

The I/O Donkey can test and exercise any input, output or communications device, serial or parallel, without tying up a computer or communications line, Sorbus claimed.

Parallel devices are operated to 500 kbyte/sec and serial devices from 50 bit/sec to 19.2 kbit/sec.

The unit was developed for use in a wide range of field services and is effective for disk and tape drives, line and character printers, card readers and punches and CRT terminals, a spokesman said.

Features include selectivity for isolating specific problems, 64 stored programs, manual program edit and entry, parity checking, scratch pad memory, a 1K programmable read-only memory for special data formats and an Ascii ripple generator with 64-, 128-, or 256-char. sets.

The unit, which is RS-232 and TTL-compatible, costs $3,495 from Sorbus at 150 Allendale Road, King of Prussia, Pa. 19406.

Course Aimed at Preparing For Office of the Future

NEW YORK — A course designed to prepare a company for future systems changes and technology will be presented here Dec. 5-7 by the American Management Associations (AMA).

The three-day meeting will discuss how to use management tools to effect the transition to an automated office; how to adapt nonroutine work for automation; and how to analyze workflow requirements in relation to space and technology, according to an AMA spokesman.

"The Automated Office of the Future" will also deal with equipment, mail systems and implementation strategies, he noted.

The seminar costs $425 for AMA members and $490 for nonmembers. Team fees for three or more executives from the same company are $365 per person for AMA members and $420 for nonmembers.

Additional details can be obtained from AMA at 135 W. 50th St., New York, N.Y. 10020.

Catalogs Offered Free to Readers

The following literature is available at no cost to readers:

• A brochure from Optronics International, Inc. details digital image processing instrumentation. The firm can be reached at 7 Stuart Road, Chelmsford, Mass. 01824.

• A catalog describing the Series AB card edge connectors is available from the Sales/Service manager, GTE Sylvania, Inc., Titusville, Penn. 16354.

• A six-page bulletin on the details of the Gulton Industries, Inc. DM-1050 10-column thermal printhead is available from Gulton at 212 Durham Ave., Metuchen, N.J. 08840.

• CTS Corp. Catalog 3550E describes the firm's Series 550 variable resistors. CTS is located at 6800 County Road 189, P.O. Box 266, W. Liberty, Ohio 43357.

• The HP-19C and HP-29C programmable handheld calculators are described in a brochure from the Hewlett-Packard Co., 1507 Page Mill Road, Palo Alto, Calif. 94304.

• The 1978 catalogue of general instruments has been published by Wiltron Co., 825 E. Middlefield Road, Mountain View, Calif. 94043.

• A line of computer-grade pushbutton switches is detailed in a 16-page brochure from Dialight, 203 Harrison Place, Brooklyn, N.Y. 11237.

• A four-page brochure describing Western Union Data Services' Series 1232 teleprinters is available from that firm at 70 McKee Drive, Mahwah, N.J. 07430.

• A catalog of media filing modules is available from Kwik-File, Customer Service Dept. 2845 Harriet Avenue South, Minneapolis, Minn. 55408.

• A catalog of magnetically shielded floppy disk preservers is available from the Magnetic Shield Division, Perfection Mica Co., 740 N. Thomas Drive, Bensenville, Ill. 60106.

• Tariff, Inc. has a six-page brochure that explains the company's preaudited, computerized freight payment plan. Contact Tariff, Department B, 53 Main St., Woodbridge, N.J. 07095.

• A 16-page booklet describing the remote computing services available from Calldata Systems, Inc. is available from the firm at 20 Crossways Park North, Woodbury, N.Y. 11714.

• An illustrated 22-page booklet describes how to use opto-isolators effectively, defines technology and shows connecting circuits for use with TTL devices. It is available from Jim Futer at Litronix, 19000 Homestead Road, Cupertino, Calif. 95014.

• Visual Methods, Inc., 5 Wortendyke, Montvale, N.J. 07645, has a brochure that describes some of its access control and visual surveillance systems.



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Planning Eases Strained Relations

By Ann Dooley
CW Staff

NEW YORK — The expectations of a first-time user are often not met by a minicomputer vendor — and vice versa, users and vendors agreed at a recent conference here.

But many of the frustrations encountered by both parties during the first-time user's conversion from a manual to an automated system can be avoided if the user gives some thought, planning and commitment to the project, according to Doug Kemp, president of Health Control Corp.

Total commitment to the conversion effort is the top priority, first and always, and that means a commitment by every department, Kemp stated. "If you don't have that commitment, don't do it — wait until you do have it," he urged.

In addition, the total importance of the system to the company must be stressed to all personnel, he said. A real problem can occur because people who haven't been through computerization have a negative attitude about it because it means change for them, he said.

But that change can be eased if the company tries to help its workers adjust, he added.

One thing the user company should do is designate someone with total authority or nothing will get accomplished.

(Continued on Page 66)

DDP: Buzzword Or Byword?

Almost every small business system vendor says it offers it; IBM is eyeing it; the mini makers say they've had it for a while, but they continue to enhance it; the data entry people are merging into it and some enterprising, pioneering users are actually trying it.

What is it? Distributed data processing, otherwise known as DDP.

In February, *Computerworld* will present a special report on DDP, designed to be a forum for users' ideas and experiences in that area.

If you are considering DDP, if you've distributed your processing, if you've sacked your mainframe in favor of multiple minis, or if you just have an opinion on the matter, CW would like to hear your story, and so would your fellow users. Just submit a double-spaced article about four or five pages long by January 15. Address it to Esther Surden, Associate Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

BST Offers 3741 Stand-In

SANTA ANA, Calif. — A device that functionally replaces both the IBM 3741 data entry device and 5471 console printer keyboard unit on the IBM System 3 will reportedly be available from Business Systems Technology, Inc.

The BST/41 Model 2 is an expansion of the firm's BST/41 line, a spokesman said. It has twice the throughput of the IBM unit, plus full system control, Operation Control Language history logging and diskette data preparation functions, the company claimed. BST noted that the unit is compatible with any System 3 configured with the 3741 and 5471 software and that Model 2 diskette units are interchangeable with those used on the IBM 3740 system.

Reading 3,000 records and writing at up to 2,400 record/min, the unit offers the standard IBM 3741 read/write Modes 1 to 5, a direct keyboard entry Mode 0 and a disk copy mode C, BST noted.

Several features of the system differ from those offered by IBM, the company continued. It performs edit and search functions with character insert/delete, cursor control and expanded search capability. In addition, a time-of-day clock is optional, it said.

The unit's keyboard, which BST noted is similar to the one on the 3741, is movable and cabled to the table top enclosure that houses the CRT and diskette unit.

The system will be available in December. It will be rented for $500/mo or leased for $475/mo on a one-year plan, $450/mo on a two-year plan, $425/mo on a three-year plan. Purchase price will be $16,200 from the company at 3015 Daimler St., Santa Ana, Calif. 92705.

Service Bureau Switch Brings Credit Information Control

By Esther Surden
CW Staff

NEW YORK — Borden, Inc. International here is bringing its credit information under control after making the switch from a service bureau to an on-line system running on a minicomputer.

"We recently implemented an on-line real-time credit and accounts receivable system," Nachum Bernard, manager of management information services, explained. The system is running in 98K words of memory in a partition of the mini. It also interfaces with a host of accounting applications.

Borden decided it needed to revise its method of handling credit information in order to shorten the period of time it took to approve or reject credit. Also, the service bureau only produced one output, an aged trial balance, which was insufficient for Borden's needs, Bernard noted.

The current system provides the capability to make an on-line inquiry into a customer's record to approve, reject or withhold credit while a sale is in progress.

The system is broken down into two phases — credit and accounts receivable. Each of the portions has inquiry capabilities and produces a variety of reports. Each runs from 9 a.m. to 5 p.m. daily with reports generated in the evening, he said.

Credit approval, checking and inquiries go through a master selector, he explained. Several passwords and other keys to the system must be used so that unauthorized personnel can not have access to the system. A user can inquire about Dunn and Bradstreet's rating of a particular customer, do a daily inquiry for credit exceptions to determine the status of a customer or find out when the last credit was rejected or approved for that company. "We can also determine which of the accounts are major delinquent accounts and can identify outstanding claims by a customer," he said.

The system is written modularly, Bernard explained. "A tremendous number of modules and programs are involved that are being overlayed, so that all those inquiry capabilities provided by the system are constantly co-resident," he said.

The system provides a reasonable response time of from 1.5 sec to 4 sec in most cases, he added, pointing out that this response time is "quite good" considering the overlays involved and the fact that "the files with which we are dealing are enormously large."

The system runs on a Data General Corp. Eclipse C300 with 92M-byte disk drives as well as communications gear. The terminals used for inquiry are either Hazeltine Corp. or Data General, he said. Programming was done in DG Fortran V, operating under the firm's mapped real-time disk operating system, he continued.

The system interfaces wiht the accounts receivable system so that whenever a credit is issued to a given customer, an accounts receivable record is immediately created and the balance can then be monitored.

It also interfaces to the order entry system, he said. Every time a sale is final, the information for a given customer goes to the banking portion of the order entry system. Whenever a record is put into the banking system, it triggers the accounts receivable file for a given customer in the credit and accounts receivable system, he noted.

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Planning Seen Easing Conversion Frustration

(Continued from Page 65)

Training is an essential part of computerization and time should be set aside specifically for the task of learning, he said.

Kemp also told the audience that decisions should be made as soon as possible and then put in writing to ensure efficiency.

Total commitment, the key to successful computerization, can be displayed by the amount of time set aside for the changeover, Kemp said. The time can be set aside by segmenting a certain amount and assigning someone time to be spent on learning the system.

Another method of converting is to bring in outside people if the present staff is really too busy to put aside any time, he said.

Installing a small business machine is really the same as installing a large processor — it's just a bigger box that costs more hardware dollars, but the procedures are the same, Kemp said.

Once the commitment has been made, customization and design of the system must occur, according to Kemp.

The system shouldn't be designed for the president of the company or the programmer, but for the people who operate it, Kemp said. Their needs should be determined before design begins, he added.

In addition, he pointed out, it's essential to get user input in order to differentiate between what is needed and what is nice to have.

Once input is received, the best working format is selected and an analyst is consulted, the person in charge should make the final decision on his own, Kemp advised.

After the system choice has been made, staffing and training should be the next priority since "people make or break the system."

Decide who's going to work in what area, train them and assign them a specific time for the changeover, Kemp suggested. The manager should also evaluate his staff since some people just don't work well with automation and can't make the change, he warned.

Converting the manual data to the automated system is the most time-consuming part of the process, so good planning is necessary, he said. Operation schedules and procedures should be written, done the same way each time and performed at an assigned period of the day.

A system should be purged regularly, the data stored elsewhere and numerous audit trails implemented since more can go wrong with an automated system than a manual one, he noted.

Philips Gives U.S. Users System Options

WOODBURY, N.Y. — Philips Business Systems, Inc. unveiled two products for U.S. small businesses recently.

Described as fully integrated hardware/software systems, the units were designed for first-time users or those presently replacing accounting machines.

The Model 330, which uses Visual 1 software, includes a 1,920-character CRT with a hard-copy printout capability, front forms-feed handling, a matrix printer and two double-density floppy disk drives.

Program input for the Model 330 is via cassette tapes, a spokesman said, and up to four floppy drives can be accommodated.

The 330 is supplied with software for sales accounting, general ledger, inventory management, accounts receivable and payable and financial statements.

A feature of the system allows the user to continue operating with his current invoices; up to 40 invoices with five product lines and up to 80 invoices with one product line can be printed each hour, the firm said.

A formatter allows the system to conform to the user's invoice, the spokesman added.

The system's nonvolatile core memory is "used as a data dump," the firm said.

The second system introduced was the Model 430, which "has all the capabilities of the 330 plus removable cartridge disks and the ability to be programmed in Cobol and RPG," Philips said.

The Cobol is ANS-compatible and the RPG is similar to that of the IBM 32, the spokesman noted. Users wishing to convert from the IBM 32 to the Philips system would need to go through a program conversion process, he added.

Memory for the larger system is MOS. Minimum memory available is 32K and is expandable in 16K increments with no upper limit placed on the amount the system can accommodate, a spokesman claimed.

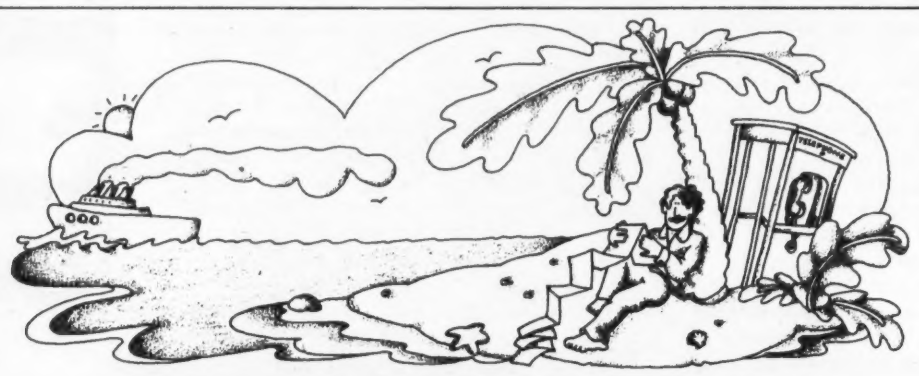
Multiple printers, disk drives in 10M-byte capacities and CRTs can be attached to the Model 430, which runs under a disk operating system featuring multiprogramming, spooling, job streaming, and random, sequential and dynamic file access capabilities, the firm noted.

Tuning Available

A typical Model 430 has 32K bytes of memory, a single-screen CRT, a 100 char./sec printer and 10M bytes of disk and costs $33,000.

A Model 330 can range in price from about $25,000 to $30,000. Some minor software tuning is required to fit the applications to the user's shop and the pricing depends on the extent of modification required.

On the average, the tuning would cost about $2,200 the spokesman stated from 173 Froehlich Farm Blvd., Woodbury, N.Y. 11797.



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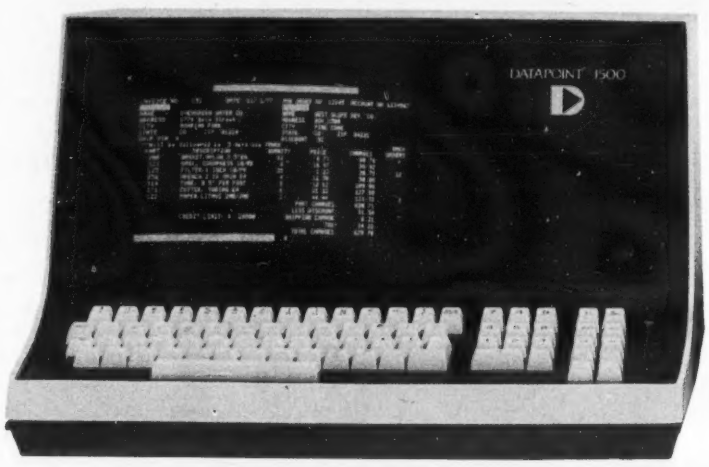
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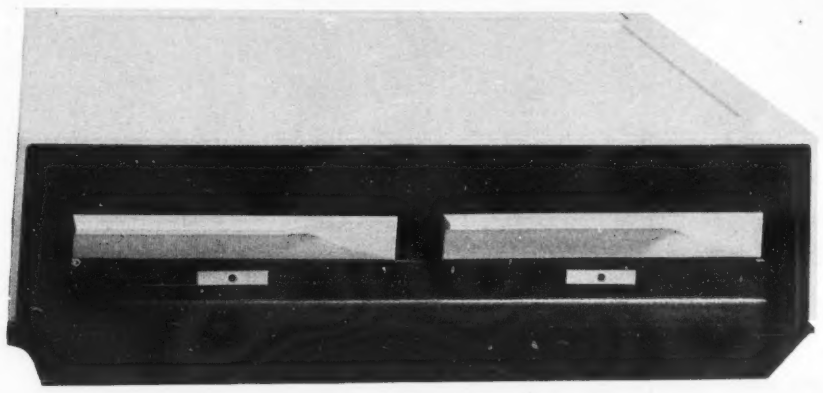
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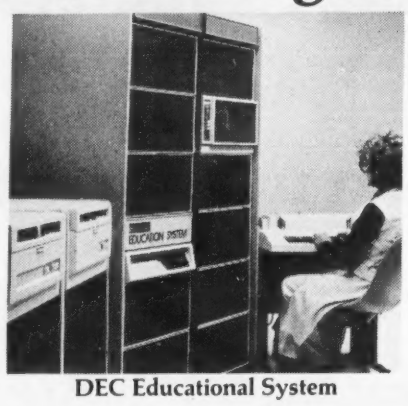
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Educational Units Packaged

MAYNARD, Mass. — Digital Equipment Corp. has packaged some systems especially for educational users. The systems range from entry-level interactive and mark-sense batch systems to a multi-language time-sharing system.

A single-user ES210/C composed of a PDP-11/03 CPU with 56K bytes of MOS memory, dual floppy disk unit, CRT or Decwriter II printer, RT-11 operating system and Basic costs $15,613.

The ES570/W includes a PDP-11/70 with 256K bytes of memory, 176M-byte disk unit, 9-track tape system, 300 line/min printer and Decwriter II console. Software includes the RSTS/-E operating system, Basic Plus-2, Decal (DEC's author language for computer-aided instruction) plus one scientific and one commercial language. This system is priced from $165,060.



DEC Educational System

Other systems are available from the DEC in Maynard, Mass. 01754.

Cache Buffer Fits PDP-11s

MINNEAPOLIS — Fabri-Tek, Inc. has introduced its Model 920/981 cache buffer enhancement for Digital Equipment Corp. PDP-11 minicomputers.

The Model 920/981, which uses bipolar technology, provides 2K bytes of memory on two printed circuit cards, forming a single plug-in module.

In PDP-11/35 and 11/40 computers, the cache buffer can be used to replace the M981 Unibus Terminator module, Fabri-Tek said.

In PDP-11/34 and other PDP-11 Series processors, it replaces the M920 Unibus Jumper Module.

The Model 920/981 buffers the whole CPU main memory. The module requires no hardware or software modifications, and comes with an on-line/off-line switch capability, the company said.

Cycle/access time is 300 nsec.

The price for a single cache buffer is $4,250, Fabri-Tek said from 5901 S. County Road 18, Minneapolis, Minn. 55436.

System Built on 8080 Type

SANTA ANA, Calif. — A small business system designed around an 8080-type microcomputer is available from Applied Data Communications here.

The Advent 1000 system includes the CPU, an IBM-compatible floppy disk drive and a CRT. It can expand to include up to eight floppy disk drives, 64K of memory, four 10M-byte disk cartridges, eight CRTs, a magnetic tape drive and three printers, the company said.

Capabilities include asynchronous communications at 9,600 bit/sec and synchronous communications at 19.2 kbit/sec.

The system operates under Micro-DOS/Basic, which the vendor said is an amplification of Dartmouth Basic that allows easier writing of programs. The software also includes a file-oriented data base management system and an interactive multiuser operating system.

The Advent 1000 features string handling, string match and variable length strings and string arrays. Sequential, relative and indexed sequential files are also handled, the firm said.

A basic system with 32K bytes of memory, two floppy disks, CRT and a 60 char./sec printer costs $9,500 from the company at 1509 E. McFadden Ave., Santa Ana, Calif. 92706.

Ampex Memory Fits PDP-11

EL SEGUNDO, Calif. — Ampex Corp. has an add-on parity memory that provides 32K to 128K words of memory for any Digital Equipment Corp. PDP-11 system using a Unibus structure.

The ARM-1100P add-on memory was designed to expand memory from any 8K boundary in 32K increments up to the maximum of 128K words. It uses only one CPU slot and requires one Unibus load, Ampex said.

Each ARM-1100P is supplied with wired card rack, power supply, interface, parity control, cooling fans and interconnecting cables, making the memory independent of the CPU with the only interconnection via the Unibus interface, the firm said.

Two-Way Interleaving

The ARM-1100P provides an access time of 375 nsec and a full cycle time of 700 nsec. In addition, two-way interleaving of equal blocks of Ampex and DEC memory is available, the spokesman noted.

The ARM-1100P add-on memory ranges in price from $4,950 for 32K to $12,750 for 128K. Ampex is located at 200 N. Nash St., El Segundo, Calif. 90245.

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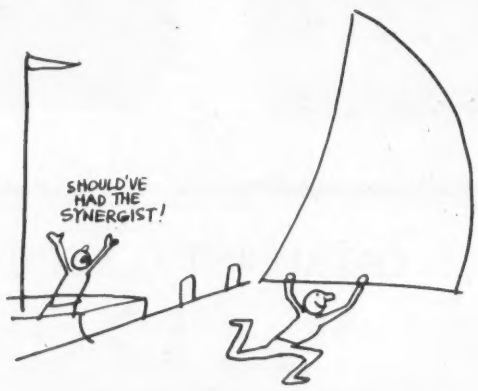
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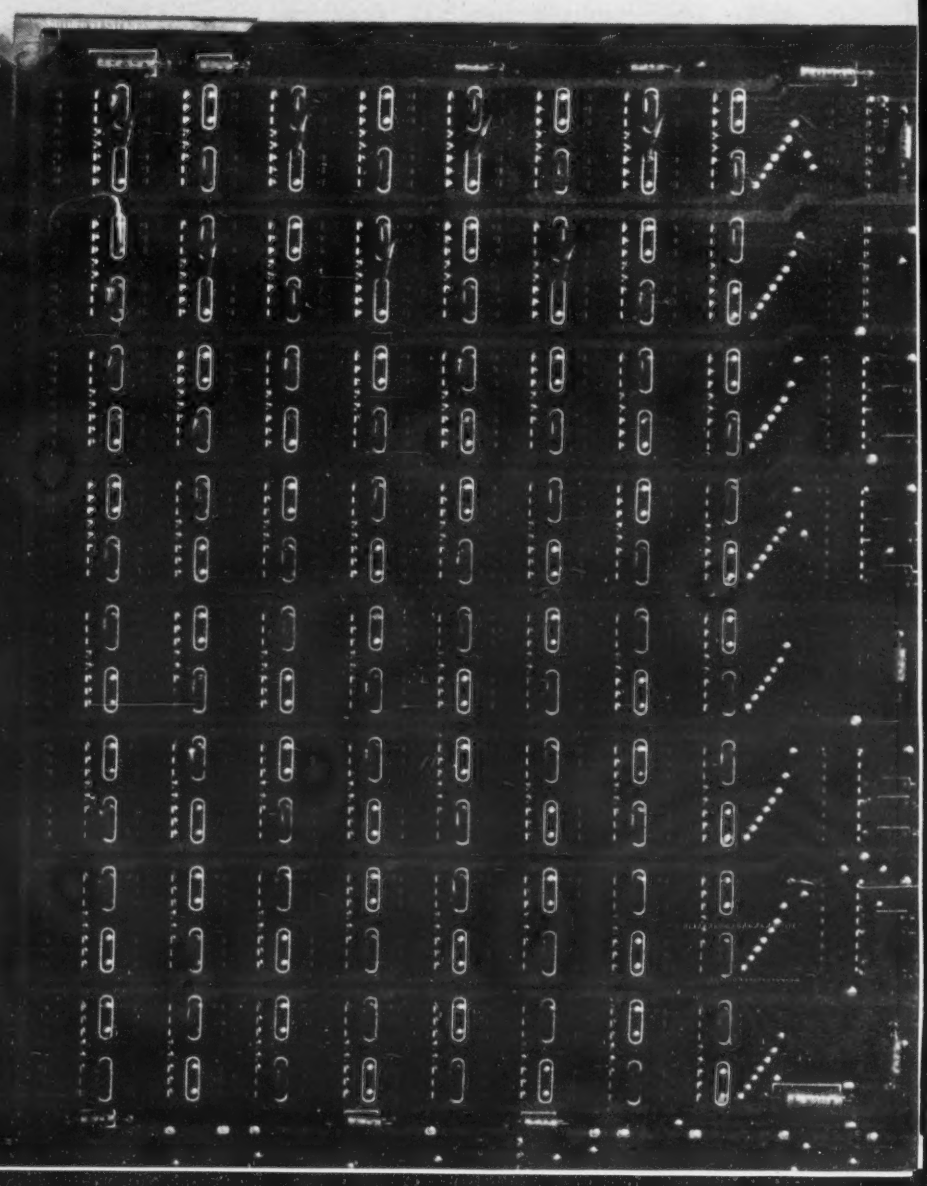
For complete information on Mostek Memory Systems, call Memory Systems Marketing at (214) 242-0444.

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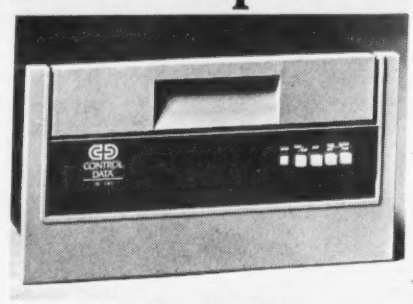
*Trademark of Data General Corporation

CDC Extends Disk Options

MINNEAPOLIS — Control Data Corp.'s 9448 cartridge disk drive was designed for use with minicomputer and small business systems.

The drive transfers data at 9.6M bit/-sec and is interface-compatible with the company's storage module drive and mini module families of disk products. Users can mix the three types of drives on a single controller, the company said.

The 9448 is available in three basic models with storage capacities of 32M-, 64M- or 96M bytes of memory. The module accommodates a 16M-byte front-loading cartridge and up to 80M bytes of fixed disk, CDC said.



CDC 9448 Drive

Removable Cartridges

Using the drive, data can be copied from fixed disks to removable cartridges for security, a spokesman noted.

Average access time for the disk is 30 msec and average latency is 8.33 msec at a 3,600 rev/min rotational speed, he said. Each recording surface includes 384 track/in. and data is recorded at densities of 6,038 bit/in.

The 9448 drive includes microprocessor-based control logic and is available in a cabinet or in a rack-mountable version. It costs $3,900 for the 32M-byte model, $4,950 for the 64M-byte unit and $6,000 for the 96M-byte module.

The removable cartridge costs $205. It will be available in the second quarter of 1978 from CDC, Box O, Minneapolis, Minn. 55440.

Help for 3/10

KING OF PRUSSIA, Pa. — Sorbus, Inc. has inaugurated a maintenance service program designed to meet the needs of IBM users.

The maintenance service plan includes both preventive and remedial maintenance for all standard components of an IBM 3/10 including CPU, peripherals and associated communications equipment, Sorbus said.

23 Service Areas

The plan is now available in 23 service areas including Atlanta, Baltimore, Charlotte, N.C.; Chicago, Detroit, Houston, Kansas City, Kan.; and Los Angeles.

Sorbus is located at 150 Allendale Road, King of Prussia, Pa. 19406.

Continental Has Line Printers

BEDFORD, Mass. — A series of medium- and high-speed line printers has been introduced by Continental Resources, Inc.

The series includes the CP-300, which can print 160- to 300 line/min, the CP-600, which runs at 330- to 600 line/min; and the CP-1000, which handles 580-1,200 line/min.

Each features chain technology and full print line buffering, the firm said. The series is compatible with Digital Equipment Corp.'s PDP-11 minicomputers.

The cost of the CP-300, CP-600 and CP-1000 printers is $12,500, $15,500 and $17,500 respectively, Continental said from 175 Middlesex Tnpk., Bedford, Mass. 01730.

HP Unit Gathers Obstetrical Data

WALTHAM, Mass. — Hewlett-Packard Co. has a mini-based obstetrical data system that, when linked to bedside HP 8030 series cardiotocographs, simultaneously gathers fetal heart rate and uterine activity data.

The heart of the system is the high-speed, large-memory HP 9825A desktop computer, which features an integral printer and uses magnetic tape cassettes for data and program storage and retrieval, a spokesman said.

The basic obstetrical data system costs $17,000 from HP's Medical Products Group, 175 Wyman St., Waltham, Mass. 02154.

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SEE PAGE 3.

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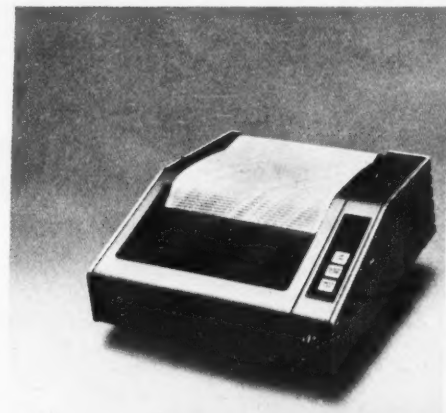
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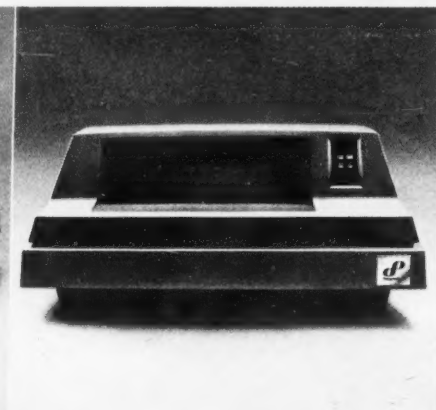
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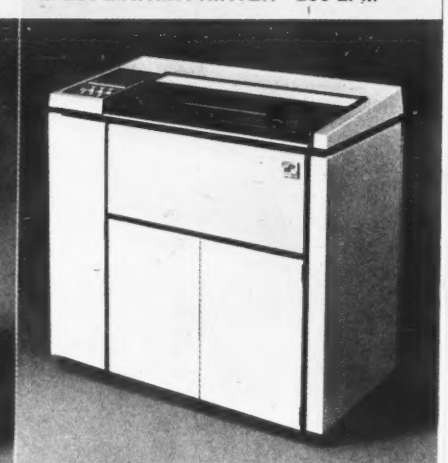
M-200 MATRIX PRINTER—200 LPM



2290 LINE PRINTER—900 LPM



2470 LINE PRINTER—1250-2000 LPM



2550 CHARABAND PRINTER—1500-2000 LPM

Small System Treats Pharmacy's Cash Flow Ills

By a CW Staff Writer

DES MOINES, Iowa — A small business system at a pharmacy here has been the prescription for the firm's cash flow problems, according to Ron Secrest, partner in Sun Park Fair.

The pharmacy had been experiencing rapid growth. "Probably 50% of our business is done with insurance companies that insure a whole group of people," Secrest explained. Filling out the forms took a great deal of time and that tied up the cash flow. "Now we can fill in and send in the forms every day," cutting turnaround time by some 30 days, he noted.

"Our business expanded to the point that we knew we needed to hire more people, while we also needed a more sophisticated recordkeeping method," he said. This pointed to computers as a solution. So the company began looking for some way to accomplish its goals. First it looked at three or four companies that would put a terminal on-line to a large computer at a wholesale pharmacy outlet, but "we liked the idea of having the system in-house and being able to tailor it to our needs," Secrest said.

The company looked around but couldn't find a small system that had a pharmacy application at that time, he noted. Olivetti Corp. of America, however, was willing to work on writing one with the company, so it installed an A5 accounting system.

The system "sits right where we used to have typewriters," Secrest said. Because of Iowa laws requiring that all prescription labeling must be handled directly by a registered pharmacist, the pharmacists do all the data input themselves. Insurance forms, however, can be prepared with help from clerks, he added.

Follows Rules

"There are a lot of federal as well as state rules that have to be met when filling prescriptions," the pharmacist noted. For example, the pharmacy must keep a record of each prescription including for whom it was filled and other pertinent information. These records must be posted in a journal so that inspectors can examine them. The system keeps track of the prescriptions filled each day and at the end of the day produces a summary report for the journal, Secrest noted.

Each prescription must also be labeled. Formerly a manual procedure, the labeling application is now automated so that if the pharmacist is filling a prescription for the second time, he need only insert a magnetic card into the system. Thus, any prescription is just typed once.

The system also produces a "neatly typed receipt," which is somewhat of a novelty in the pharmacy business, he indicated. Many receipts are unacceptable to insurance companies, while this one is detailed enough for their needs.

ITI Schedules Winter Courses

McLEAN, Va. — Three courses on minicomputers and distributed data processing will be offered by Innovative Technology, Inc. (ITI).

A four-session course for managers who "require an overview of the latest computer hardware and software technology" will be given on Tuesday evenings beginning Nov. 15 from 7 p.m. to 9:30 p.m. at the company's headquarters here.

A repeat performance beginning March 7 will be given every Tuesday and Thursday evening during the same hours.

A six-session course to provide DP managers with an efficiency checklist for their systems and to identify the techniques and hardware available to the managers will be offered Jan. 1-26 on Tuesday and Thursday evenings.

An eight-session course for system analysts and programmers will be taught on Wednesday evenings beginning Feb. 8.

The four-session course costs $300, a six-session course costs $400 and an eight-session course costs $500. Information is available from the company at 1651 Old Meadow Road, McLean, Va. 22101.

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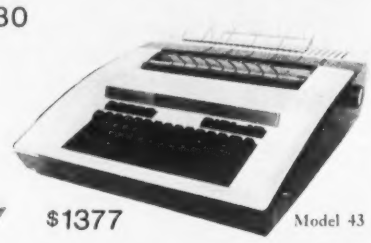
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Redundant Minis Viewed Path to Fault-Tolerant DP

By Esther Surden
CW Staff

SEATTLE — Using minicomputers for fault-tolerant computing is becoming more important as these small systems are increasingly being used in life support applications in hospitals or for vital maneuvers in the space program, according to Richard J. Spillman, a doctoral student in electrical engineering at Utah State University.

Delivering a paper entitled "A Fail-Safe Redundant Architecture for Fault Tolerant Computing" at a recent conference here, Spillman noted that redundancy is the most common method of obtaining fault tolerance.

A technique often used is the triple module method, in which three copies of a module perform the same function. A separate voter module selects the majority output in a case of a failure, Spillman explained.

Another method of obtaining fault tolerance is the hybrid method, which uses an elaborate system of switches and spares. The switching system has the task of swapping out a bad module and replacing it with a good spare.

Both of these systems have disadvantages, Spillman noted. If two of the modules using the triple module technique go bad, the voter selects bad output because it must select the majority output. In addition, the voter itself is subject to failure.

Systems using the hybrid method have problems with complicated switching circuits and spare parts that run out, he added.

Fail-Safe Systems

Fail-safe systems use an entirely different technique of fault tolerance. These systems are designed to fail in such a way that the least amount of damage will take place.

For example, in a traffic system, all the lights will fail by turning red, not green, because it is safer for the cars to stop. In a medical situation, such a system would notify the doctor or nurse when it failed so the patient would not be left unsupported.

Describing a method that combines fail-safe techniques with triple module redundancy, Spillman presented a system model in which each module is made fail-safe so that if it fails, it produces an output upon which the gate will not act.

The voter then becomes a very simple switching device, not often subject to failure, which will only let outputs other than the inaccurate one pass.

Some advantages to this method include the use of a simpler gate which is less likely to fail. Also, no restrictions are placed on the number of modules that can be used.

Some disadvantages can be associated with this method, he admitted. For example, fail-safe design requires some extra gates within the modules which slightly increases the probability of failure.

In addition, multiple faults can go undetected, producing an unsafe fail. Scientists are working on the problem.

Techtran Adds Disk Recorder

ROCHESTER, N.Y. — A microdisk recorder that is compatible with Digital Equipment Corp., Intel Corp. and RCA disk systems has been introduced by Techtran Industries, Inc.

Diskettes recorded on the Techtran 9512 via an RS-232 terminal or data logger can now be read on these minicomputer disk systems. Also, diskettes generated on-line from DEC, RCA or Intel systems can be read off-line back to an Ascii terminal or to a remote location.

Standard features reportedly include random access by character string and bidirectional skip. The unit sells for $2,595 from Techtran at 200 Commerce Drive, Rochester, N.Y. 14623.

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PRINCETON, N.J. — The "first complete" Ansi-standard Fortran IV designed and written for a microcomputer has been introduced by Technical Design Labs, Inc. (TDL).

This Fortran IV is equipped with extensions that reportedly exceed the usual Ansi standard requirements. The package includes a full type conversion, a full library of scientific and string functions, a linking loader with an automatic library search, fully formatted I/O, sequential and direct access I/O and hex constants, the firm said.

TDL Offering Fortran IV For Micros

The complete package, which runs with less than 24 K and includes the floppy diskette with object code and a user's manual, costs $349 from Technical Design Labs, Inc., Research Park, Building H, 1101 State Road, Princeton, N.J. 08540.

Publishers, Stores Abound

First Midwest Show Has Local Flavor

By Frank Vaughan
CW Staff

CHICAGO — Over 12,000 visitors poured into the "world's largest" Holiday Inn here to see 84 booths and more than 60 exhibitors at the '77 Midwest Personal Computing Show.

The show had a slightly different flavor from most of the microcomputing shows this year. The manufacturers did not dominate the exhibit space; instead, publishers, stores and dealers were in great abundance.

Of the major vendors who did exhibit, Commodore's Pet was probably the most sought-after exhibit, with the exhibitors immediately surrounding the double booth benefiting from the overflow.

Tandy Computers (Radio Shack) also drew a great deal of interest from the visitors, as it has at the past few shows, partly because it offers one of the more visible microcomputing systems in the noncomputer retail area.

Digital Equipment Corp., which also participated in New York's Personal Computing Exposition, was one of the more unusual exhibitors. Although the minicomputer firm brought no hardware to either show, limiting its sales to cases upon cases of books, it also did some personnel recruitment.

"I personally know of no plans that DEC has to enter the hobby area, but then I don't know everything that DEC does," one of the recruiters said. DEC's purpose in attending hobby shows is twofold, the exhibitor noted. First, hobbyists look for a lot of the manuals and documentation that DEC has published for its minicomputer lines, especially in the PDP-8 area. Second, the hobbyist makes a very attractive employment candidate.

Largest Display

Mits had the largest display on the show floor, taking six booths on the end of an aisle. The firm only used four of the six booths to give an island effect, which drew hobbyists from all directions. The booth also was staffed by employees of some of the local Mits/Altair stores, in keeping with the local flavor of the show.

Among the publishers present, Creative Computing, People's Computer Co., Personal Computing (show sponsors) Matrix Publishers/Dilithium Press, Hayden Books and Kilobaud provided a variety of reading material for the hobbyist.

Creative Computing magazine's booth contained its usual assortment of magazines, books and catalogs — along with some of the not-so-usual items such as binary dice and the firm's "Computer Rage" game. Personal Computing sold mostly back issues while Kilobaud's Wayne Green drew large crowds of both hobbyists and Ham radio enthusiasts who were interested in picking up books, magazines, back issues and a chance to win a trip to the Caribbean. Hayden and Dilithium (named after the types of crystal needed to power the warp drive on television's Starship Enterprise) both sought out the hobbyist-store owner trade for book sales.

Among the dealers offering mail-order catalogs were the Byte Shop/Micro Age stores and the Itty Bitty Machine Co., Inc. who ask that people spell out the company name fully because "we don't want to be confused with any other computer company selling hardware under our initials."

Educationwise, the show offered both free and paid seminars for the visitors. Among the free seminars was "Math Packages for Small Business Applications" by Gerald Koppel of the AAA Chicago Computer Center; "Introduction to Computer Hardware;; by Arthur Kingsnorth of E&L Instruments; "Computer Music for the Hobbyist" by Malcolm Wright of Solid State Music as well as several others.

Seminars which users had to pay for included a series on microprocessors by Rodney Zaks of Sybex and a "computer school" by Gene Morrow of Computer Power and Light.

In New York City

Show Introduces Uninitiated to Micros

By Frank Vaughan
CW Staff

NEW YORK — Every time one of the elevator doors opened, another mob piled into the already crowded floor of the Personal Computing Exposition at the Coliseum here. By the end of the three-day show, over 13,000 people had managed to crowd onto the floor, many of them apparent newcomers to the field.

The show here was large, with wide aisles, 142 booths and 94 exhibitors. Many of the major manufacturers were present, as were most of the firms' product lines, either through manufacturers' or dealers' booths.

The crowd at the show was different from that of most microcomputing shows, with the $5 admission fee attracting many people who otherwise might not have attended. Many of the dealers were made acutely aware of the large number of uninitiated visitors when they found themselves answering fundamental "what-is-a-microprocessor?'-type questions.

In a sense, the show here was the first chance for the public to actually see microcomputers — and the results were favorable, if the number of bundles, bags and boxes being carried out the doors was any indication of total sales.

Even the local entrepreneurs were out in strength. One youth walked the show floor in search of a customer to buy a slightly used calculator. And the ever-present Coliseum hot dog (all beef, only $1.35) sustained many of the vendors for the three days of the show.

Free seminars encompassed such subjects as "Applications of Home Computers: The Myth and the Reality"; Microcomputers in Education"; "How to Build Personal Computer Kits"; and the general subjects of speech analysis, music, getting started and music synthesis. Speakers during the show ran the gamut from publishers (David Ahl, of *Creative Computing*, Robert Jones of *Interface Age* and Carl Helmers of *Byte*) to store owners (Dr. Portia Isaacson of the Micro Store) to scientists (David Fylstral of SRI International).

A series of special programming sessions was also run with such topics as: an introduction to Warnier-Orr structured programming; the SMAL/ST compiler; teaching calculators tricks; basic Basic; proving that a program is correct; and a high-level assembly language for micros.

Rounding out the educational opportunities at the show was a series of tutorials by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society. Six day-long tutorials were held, three at the basic level and three at the intermediate/-advanced level.

One of the more unusual exhibits came under the title of Microcomputers for the Handicapped, an organization that was formed at Personal Computing '77 in Atlantic City under the leadership of Dr. Robert Suding, research director of The Digital Group. The group is interested in using microcomputers to assist the handicapped in the daily routines.

Book 'Debugs' Debugging

DERBY, Conn. — A paperback book that describes a method of entering, debugging and storing assembly language programs is available from E&L Instruments, Inc.

DBUG: An 8080 Interpretive Debugger, by Christopher A. and Jonathan A. Titus, instructs the user on how to enter a program into an 8080 microcomputer memory and single-step it through, instruction by instruction.

Dbug resides in a 1K-byte block of memory and I/O routines can accommodate magnetic tape cassettes, CRT terminals or paper tapes.

The book, including a bootstrap loader, two listings (one in octal code and the other in hexadecimal) and examples of applications costs $5 from E&L Instruments, Inc., Derby, Conn. 06418.

batch processing — 1. In computer terminology, batch processing refers to a specific method of processing in which a number of similar input items are grouped for processing during the same machine run. 2. Batch processing computer systems generally do not require immediate updating of files. In batch processing, data is gathered up to a cutoff time and then processed.

baud rate — A type of measurement of data flow in which the number of signal elements per second is based on the duration of the shortest element. When each element carries one bit, the baud rate is numerically equal to bits per second (bit/sec).

benchmark — In relation to microprocessors, the benchmark is a test point measuring the performance characteristics of products offered. A benchmark program is a routine or program selected to define or compare different brands of microprocessors. A flow chart in assembly language is often written out for each microprocessor, and the execution of the benchmark time, accuracy, etc. is evaluated.

bidirectional — Generally refers to interface ports or bus lines that can be used to transfer data in either direction, e.g., to or from the microprocessor.

binary code — A code in which every code element is one of two distinct types of values. For example, the presence or absence of a pulse.

binary coded decimal (BCD) — A system of number representation; that is, an information code in which each decimal digit is represented by four binary digits.

binary dump program — — A program that provides a means for printing displaying or punching a binary tape copy of any portion of memory. The output may be selected as either absolute or binary relocatable.

binary loader — This is used to load a binary format such as those produced by the binary dump program, the link editor or an assembler into memory.

biopolar (unipolar) — When a logical "true" input possibly is represented by an electrical voltage polarity opposite to that representing a logical "false" input, the signal is defined as bipolar. If both "true" and "false" inputs are represented by the same electrical voltage polarity, the signal is defined as unipolar.

black box — A generic term which can describe any unspecified device performing a special function where the inputs produce specific outputs.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.

COMPUTERWORLD
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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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RCA Microtutor II Gives Programming Experience

SOMERVILLE, N.J. — A microcomputer system designed for hands-on operating and programming experience has been announced by RCA.

The Cosmac Microtutor II is preassembled and contains its own regulated power supply, the firm said. The unit provides input via eight binary toggle switches and output on two seven-segment light-emitting diode (LED) hexadecimal digit displays.

Microtutor II is supplied with 256 bytes of complimentary MOS random-access memory (RAM) on a card that attaches to the base through a standard 44-pin connector, a spokesman noted. An additional prewired socket and connectors are provided for system expansion.

More RAM and user I/O interfaces can be connected to this socket and an operating system can be loaded to provide a utility memory, the spokesman added.

The unit has a crystal clock for stabilized timing applications and a memory protect switch which prevents the memory write operation from writing to itself.

The Microtutor II, which operates from a 115V 50/60 Hz power line, is priced at $195 from RCA, Box 3200, Somerville, N.J. 08876.

I/O Board Options Grow

NORWOOD, Mass. — Analog Devices, Inc. has expanded its analog input/output subsystem product line to include data acquisition and analog ouput boards that are said to be compatible with Texas Instruments, Inc., Pro-Log, Intel Corp., Motorola, Inc. and National Semiconductor Corp. microcomputers.

For the Pro-Log 4- and 8-bit microcomputers, Analog-Devices introduced RTI-1220, a 16-channel data board priced at $269, and the RTI-1221, a 4-channel analog output board priced at $235 for 8-bit accuracy and $275 for 10-bit accuracy.

For the Intel SBC80 and MDS and the National Semi BLC80, there RTI-1201, a 12-bit analog output board priced at about $375 and the RTI-1202, a 16-channel, 12-bit board that costs approximately $400.

For the Motorola MM6800, Analog Devices announced the RTI-1230, a 16-channel, high-speed analog input board priced at about $450; the RTI-1232, a 4-channel analog output board priced at approximately $425; and the RTI-1231, a complete 16-channel analog input/output subsystem that costs about $500.

Analog Devices is at Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

Introductory Course Slated

DELRAN, N.J. — A three-day introduction to microprocessors that will examine hardware and software, provide design experience and look at future trends and developments will be offered by Datapro Research Corp., beginning Dec. 7 in San Francisco.

Designed for people who are active in or contemplating the use of microprocessor technology, the course will consist of an introduction and definition of micro systems, explanation of interface design, and a workshop on interface usage.

Registration fees are $425 for Datapro subscribers and $475 for non-subscribers. Additional information can be obtained from Datapro Research at 1805 Underwood Blvd., Delran, N.J. 08075.

Periodical Guide Available

ALOHA, Ore. — A guide that indexes 1,080 articles from 23 hobby and professional computer publications and contains editorials, book reviews and letters from readers which relate to the personal computing field is available from E. Berg Publications.

The *Periodical Guide for Computerists* is available for $3.00 from the publisher at 1360 S.W. 199th Ct., Aloha, Ore. 97005.

Micropolis Offers Floppy

CANOGA PARK, Calif. — A 5-1/4-in. floppy disk system offering over 1M bytes of storage has been announced by the Micropolis Corp.

The Metafloppy 1054 Model II is made up of four drives in a dual/dual configuration, a controller, power supply, chassis, enclosure, cabling and a Basic software package. It will plug into any microcomputer using an S-100 bus and stores over 1.2 million 8-bit bytes in each unit, Micropolis said.

The drives feature an all-steel head positioner system and a referencing technique that minimizes the effect of any outside distortion.

Track-to-track access time is approximately 30 msec with data transfer rates up to 250 Kbyte/sec.

The Metafloppy 1054 costs $3,220 from Micropolis at 7959 Deering Ave., Canoga Park, Calif. 91304.



The Metafloppy 1054 provides over 1.2 million bytes of on-line storage.

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IBM's Good Equal to Nation's: Memo

By Catherine Arnst
CW Staff

NEW YORK — "What's good for IBM is good for the country" was apparently the position taken within IBM during the mid- to late-1960s, according to documents released as part of the U.S. vs IBM antitrust trial.

The documents, which equate "national interest" with the firm's "financial interest", are part of a group of documents IBM has been fighting to keep from public view since the case began almost nine years ago [CW, Nov. 7].

The documents show that IBM used the criterion of "national interest" to justify preannouncing products and technologies not yet available in the marketplace.

However, there was a disagreement internally as to how to define "national interest" so that preannouncements could be made, since preannouncing was supposedly against company policy.

The issue has arisen in the trial because the government contends that IBM used early, selective announcements in order to maintain its monopoly position in the marketplace.

In January 1967, the issue arose when R.W. O'Keefe, director of financial analysis for the DP group, refused a request from the Swiss National Railways for information on automated railway control that was still under development at IBM.

O'Keefe said he did not think that situation had "the urgency that would require such a disclosure.

"My definition of national interest would be a situation which (1) involves the national defense and security [or] (2) is critical to health or welfare of the nation. I would also add the additional qualification that the disclosure is not available from other sources," O'Keefe said.

However, he was quickly answered by H. Bartow Farr, general counsel of the DP Group.

"If it is my responsibility to interpret national interest," he wrote, "I will do it as I have done in the past, i.e., financial interest is sufficient, no patriotism, health, welfare, etc. is required...Using the Robinson-Patman Act as an analogy, I have concluded and confirm my conclusion that there is no antitrust risk from defining national interest the way I have defined it," he stated.

CI Notes

Texas Department Store Selling Altair System

HOUSTON — Foley's, a department store chain here, is taking credit for being the first mass merchandiser to stock computers since it now offers a $4,995 Altair computer from Pertec Computer Corp. and a variety of software.

The Altair 8800b turnkey system with minifloppy disks will be sold for both business and home applications, according to Joseph Sternberg, Foley's divisional merchandise manager.

The applications programs that will be available from Foley's include a mailing list maintenance file, a small business check maintenance file, four games, a home check maintenance file and an auto log for car expenses.

Court Nixes CDC Contract For Pennsylvania Lottery

HARRISBURG, Pa. — A court here has invalidated Control Data Corp.'s contract for equipment and services used in the state's "Daily Number" lottery.

The award violated provisions of Pennsylvania state law calling for "fair, open, honest bidding," the judge said, after a complaint had been filed claiming that CDC was allowed to change its bid after open bidding.

The complaint was brought by General Instrument Corp., which claimed that a bid by its American Totalisator subsidiary was the low bid on the contract before CDC was allowed to change its quote.

The bidding will be reopened.

CCIA Joins Growing Opposition To Proposed I/O Link Standard

WASHINGTON, D.C. — The current implementation procedures of the proposed federal channel-level I/O interface standard "completely fail to achieve the intended benefits of this vital standard for either users, providers or the tax-paying public."

In a letter to the National Bureau of Standards (NBS), proposer of the latest version of the Federal Information Processing Standard (Fips), Computer & Communications Industry Association (CCIA) President A.G.W. (Jack) Biddle attacked the existing proposal.

In objecting to the current version of the proposed standard, the CCIA joined in opposition other notables such as Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee [CW, Oct. 31], and Norman Ream, former head of the NBS' Institute for Computer Sciences & Technology [CW, Sept. 12].

If properly drafted, such an interface standard could save the federal government about $150 million/year, Biddle said.

The current federal expenditures that would be impacted by the standard are about $700 million/year, and Biddle said it would be reasonable to expect a 20% to 30% decline in pricing of non-IBM-type peripherals, just as there has been in the competitive IBM-type market.

Attacking the standard, Biddle said, "We see absolutely no justification for a limitation on the number of channels that should conform to the standard. Every channel that is required for the interconnection of the CPU to its associated peripheral equipment should conform."

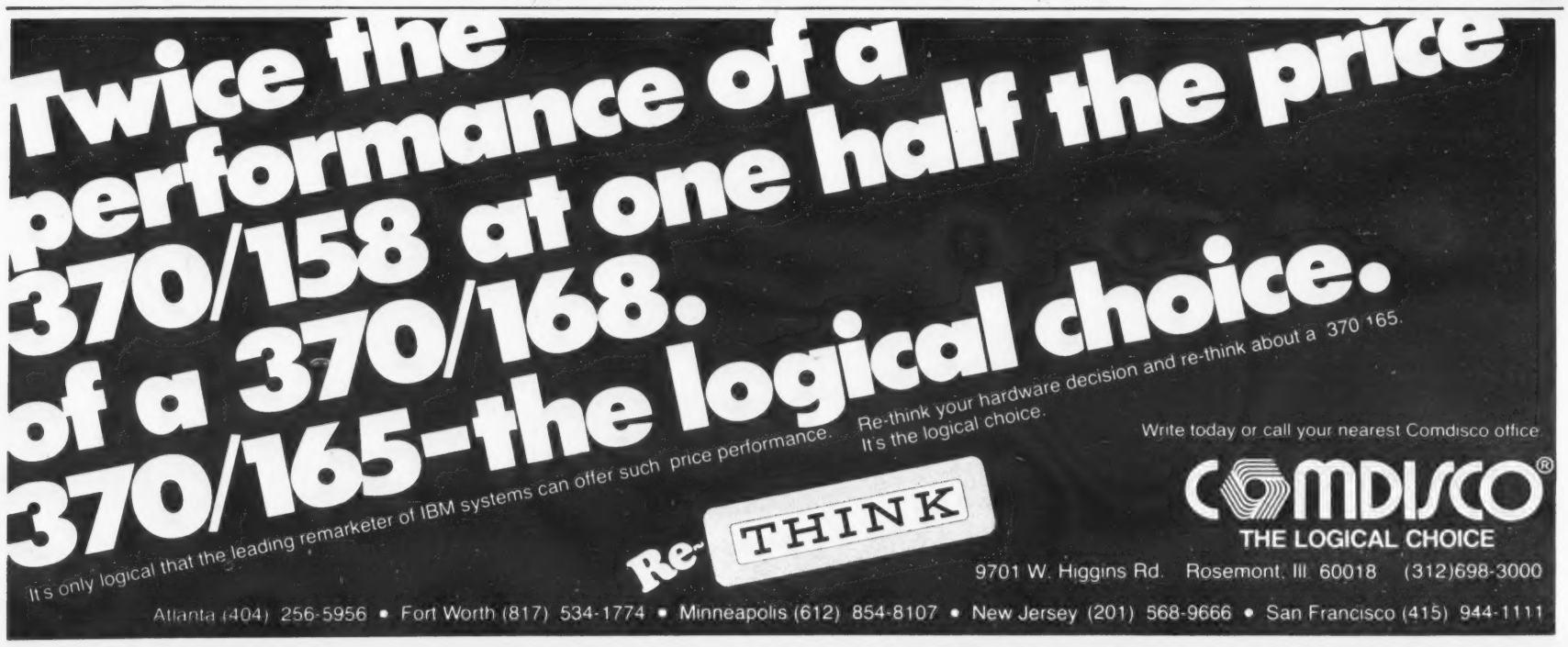
Currently, the revised version requires that one channel accommodate the standard with a maximum requirement of four such channels.

'CPU' Not 'System'

The CCIA would like the proposed standard to substitute "CPU" for the word "system" because this emphasizes to user agencies that they can acquire their CPU separately and competitively with standardized channel-level interfaces, software, maintenance and peripheral equipment.

The CCIA also disputed the clause that enables agency heads to waive the proposed standard. To do so makes a mockery of the entire Fips standardization process.

Adherence to an I/O channel-level interface standard is important because peripherals now represent 65% to 70% of the total system cost, Biddle observed, compared with 20% to 30% a decade ago.



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After 13 Weeks

NCR Employees Vote to End Strike in Dayton

By Molly Upton
CW Staff

DAYTON, Ohio — The 13-week strike by NCR employees at its Dayton Terminal Systems Division and Microelectronics Division plants here is ending.

Members of the Auto Workers Local 1616 voted to accept the terms of a three-year contract that offers improved group and retirement benefits, an NCR spokesman said. All employees will have returned by the end of this week, he added.

The firm had previously decided to keep its microelectronics plant here open. But it was moving to shutdown the terminal plant.

The Dayton terminal plant is one of four NCR sites in the U.S. that produces financial terminals. Throughout the 13-week strike, NCR has declined to comment on its impact except to say that limited production had been maintained using nonstriking employees.

The terminal plants are principally assembly units, whereas the manufacture of much of the circuitry is done by the microelectronics plants, an NCR spokesman said.

The data presented by NCR showed that its labor costs for the Dayton Terminal Systems Division are nearly $1/hr higher than for other similar plants in the U.S.: $5.01 vs. $4.03, he said.

Retirement Issue

One of the key areas of disagreement between the United Auto Workers Local 1616 and NCR was early retirement, the NCR spokesman said.

The average age of the Dayton Terminal Systems Division's employees is 53, because when NCR began its conversion from electromechanical to electronics products, the labor content was reduced and the unions applied the principal of seniority leaving NCR with the older employees, he said.

New Agreement

The new agreement, ratified by a vote of 519 to 220, includes a minimum wage rate of $5/hr and a grow-in feature for pension support.

Under the new contract, employees reaching age 54 and 25 years of service during the contact term are eligible for the benefits, whereas previously, they had to be 54 and have worked for 25 years at the beginning of the contract term.

Also, the contract lets employees receive group benefits through the age of 65 and provides extended group benefits to those laid off, he said.

Previous Negotiations

During the previous contract negotiations, the union accepted a lower wage rate than what it had been receiving, so "there has been a great deal of labor difficulty," the spokesman observed.

The Dayton Terminal Systems Division had about 650 employees on strike and about 750 more nonunion employees, he said.

Plant Locations

The other terminal plants are in Cambridge, Ohio; Ithaca, N.Y.; and Millsboro, Del., he added.

The firm determined that it was economical to continue operating the Microelectronics Division plant in Dayton, he said.

Although NCR does not supply all of its own semiconductor needs, it does supply a fair amount, he indicated. Also, the firm has special requirements that it can satisfy through its own manufacturing facility, according to the spokesman.

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GA Moving From OEM to Packaged Systems

By Molly Upton
CW Staff

NEW YORK — General Automation, Inc. is making the transition from an OEM systems house to the producer of packaged systems for the multiple unit buyer, according to Marv Silverman, manager of systems marketing.

Currently the firm's only entry in the small business marketplace is the 440 Data Series (DS) but Silverman said he intends to expand that line with the 110, 220, 330 and 550, which are currently marketed on an OEM rather than systems basis.

The firm intends to have total upward compatibility throughout its line of packaged systems, he said, and plans to add to its range of offerings and peripherals.

For example, the 440DS will be available with the IBM 2780 communications feature and eventually the 3270, he said, but the integration of the feature into he system first has to be thoroughly checked out.

Other enhancements for the 440DS are likely to include semiconductor-memory, capacity beyond 128K, the addition of virtual storage and higher speed tape drives, he said.

The firm now has some virtual 440s at beta test sites, he indicated.

Eventually Silverman sees users incorporating 440s into a network and off loading IBM 370s.

In addition, the firm has implemented the IBM Synchronous Data Link Control (SDLC) protocol for Wells Fargo Bank's participation in the Swift network, so that capability could potentially be added to the standard product line, he said.

Currently a development 440 system, which includes operating software, costs $45,000 and features one 10M-byte disk, a 200 line/min printer, a 400 card/min card reader and two CRTs.

The system can have up to six CRTs with a 10M-byte disk and up to 16 with 80M bytes.

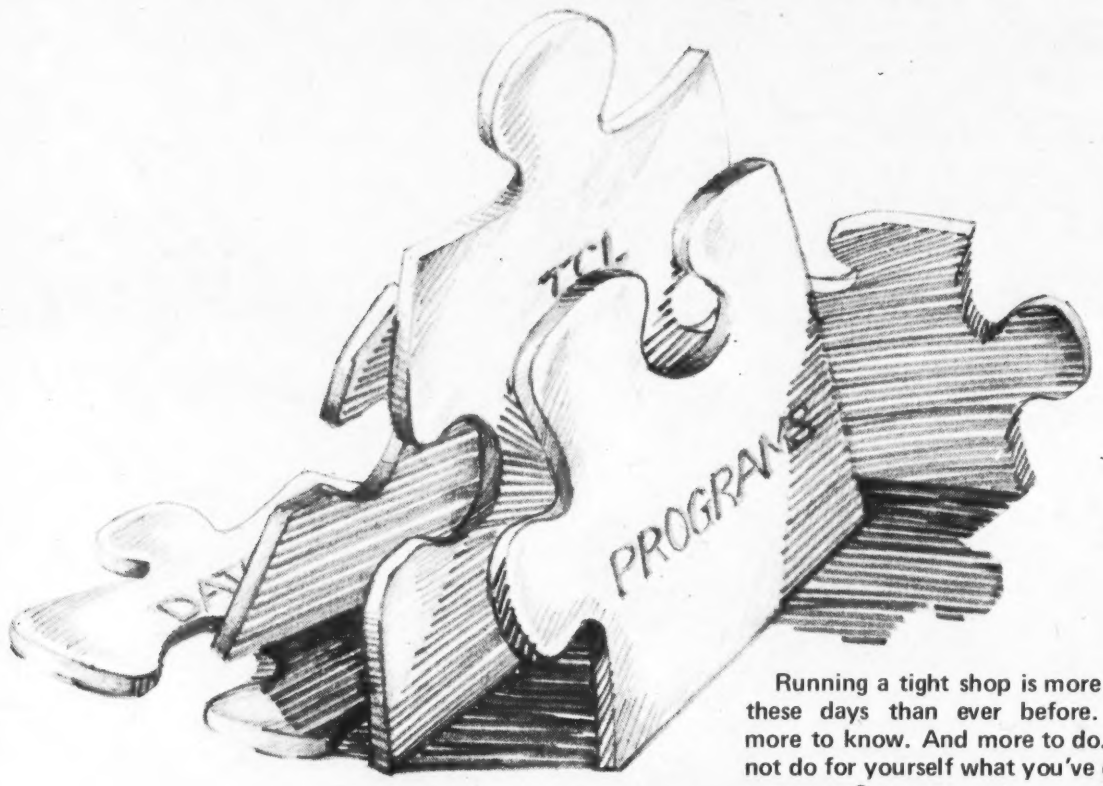
The software includes Cobol, a multiple terminal capability, a file management system and the Control 3 operating system. Of the 128K of core, half is available to the user and compiling takes only two of the 16K partitions, Silverman said.

To handle the change in marketing direction from custom-built items to emphasis on selling packaged systems, GA is beefing up its sales force, field service and software support, Silverman said.

OEM sales during 1978 should continue to climb and packaged sales should show a sharp rise, while custom systems business should decline, he predicted.

Since GA has concentrated responsibility for packaged systems, data series, industrial products and peripherals under Silverman, the firm should be able to cull particular features from its custom products for inclusion in the packaged and OEM offerings, he said.

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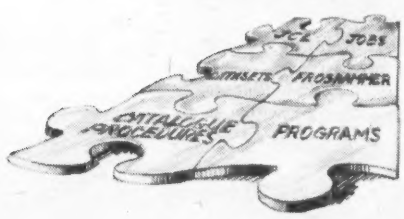


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Contracts

Distronics Corp. has received a contract from Nicklas Supply Co. to supply the firm with a DP system to automate business operations.

Datatrol, Inc. has received a contract from the state of Rhode Island to develop, implement and operate a computerized on-line "Daily Numbers Game" for the Rhode Island Lottery.

RCA American Communications, Inc. has been awarded a contract by the National Aeronautics and Space Administration (Nasa) for satellite communications links to support NASA's Space Shuttle Program and its Tracking and Data Relay Satellite System.

Storage Technology of Canada, Ltd. has been awarded contracts by the Quebec government for the installation of magnetic tape subsystems in the government's seven computer installations located in six different departments in Quebec City and Montreal.

Kennedy Co. has been awarded a contract by Cygnet of Montreal, Canada, for Kennedy's Model 9300 tape transport and associated controllers.

Hazeltine Corp. has received a contract from the U.S. Army's Electronics Command, Fort Monmouth, N.J., for 17 AN/TPX-46 IFF Ground Interrogator Systems and associated test and data items.

General Electric's Information Services Division has received a contract from Hospital Corp. of America (HCA) for the processing of HCA's management systems for the health care industry.

Business Systems Products, Inc. has been awarded a contract by WEI Corp. to install and maintain a computer system to automate the manufacture of heat dissipating components.

The Foxboro Co. has been awarded a contract by Wyeth Laboratories, Inc. for a computer-based process control system.

Texas Instruments, Inc. has received a contract from PRC Electronics, Inc. for Silent 700 data terminals.

Metrodata, Inc. has received a contract from the Kuwait Ministry of Electricity and Water to supply computer-controlled tank-level and pump control systems.

Fisher Elected Chairman

Wema Forms New England Group

FRAMINGHAM, Mass. — The Western Electronics Manufacturers Association (Wema) has formed a New England Council with 35 members.

At the group's first meeting here, Kenneth G. Fisher, president of Prime Computer, Inc., was elected chairman of the New England Council.

The New England unit is represented on the Wema board of directors by Fisher as well as by Edson de Castro, president of Data General Corp., who is a director at large.

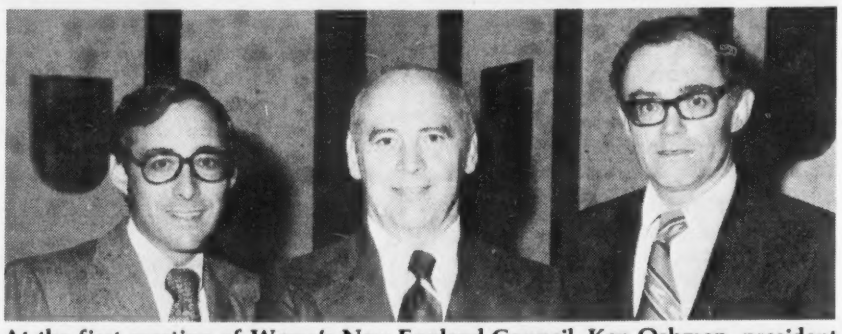
The new members have expressed their interest in the business climate in Massachusetts, particularly those aspects that affect a firm's ability to attract employees.

DG has found it is much easier to attract programming talent to its site in North Carolina than to its operations in Massachusetts, according to De Castro.

Fisher mentioned that a survey indicated MIT graduates are not enthusiastic about remaining in Massachusetts because of the income tax situation.

The Wema membership includes 1,100 electronics firms in 34 states.

Further information on the New England Council can be obtained from Ken Ritchie, The Fairways, Rte. 122, Amherst, N.H. 03031.



At the first meeting of Wema's New England Council, Ken Oshman, president of Rolm Corp., met with Kenneth Fisher, president of Prime Computer, Inc. and Edson de Castro, president of Data General.

Service Group Now 435 Strong

DANBURY, Conn. — The Association of Field Service Managers, formed in August 1976, has grown to 435 members from 94 different organizations, according to Executive Director Thomas Ross.

The purpose of the organization is to develop maintenance management of sophisticated technologies as a separate management function, he explained.

As part of its objectives, the group seeks to improve product performance, operate service as a business, develop service professionals and improve service organization effectiveness.

The AFSM plans to conduct seminars and workshops and assist in the development of formal field service programs in colleges as a means of increasing the professionalism associated with the service industry.

The organization has nine active chapters throughout the U.S. and expects to form three more before the end of the year, he added. It also plans to form one in England, he added.

Individual membership dues are $75. For further information write AFSM, P.O. Box 255, Danbury, Conn. 06810.

Micro Makers Form Unit

PRINCETON, N.J. — The Microcomputer Manufacturers' Association has been formed to handle areas of mutual interest, such as the prevention of conflicting dates for shows, according to Chris Rutkowski, president of Technical Design Labs, one of the group's organizers.

The area of most immediate concern is the scheduling of shows, he said. After that the association will probably undertake projects in such areas as setting standards.

For further information, contact Rutkowski at Technical Design Labs, Research Park Bldg. H, 1101 State Road, Princeton, N.J. 08540.

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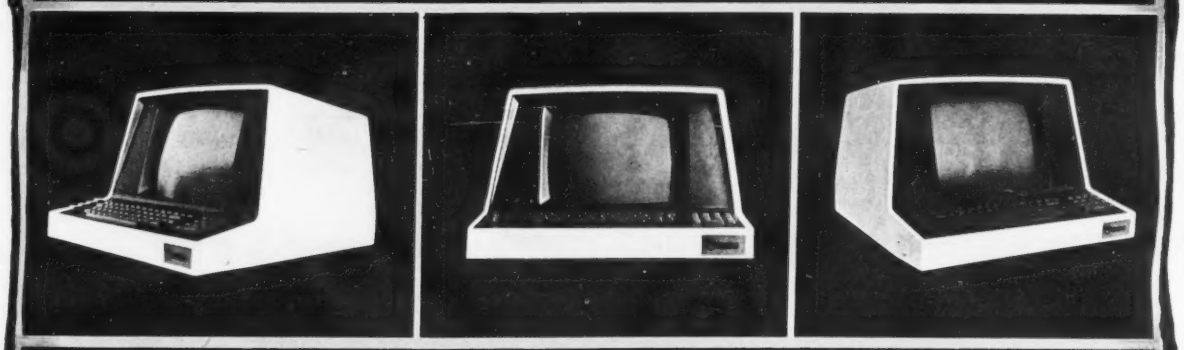
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In Three Months Net

Amdahl Tops $6 Million

MONTEREY, Calif. — Amdahl Corp. earned $6.4 million on revenues of $46.4 million in the quarter ended Sept. 30, according to a condensed balance sheet released to security analysts meeting here at the recent Western Electronic Manufacturers Association conference.

Outright sales accounted for $44.7 million of the revenues. Lease and maintenance revenues totaled $1.7 million.

For the nine months, Amdahl showed earnings of $27.6 million on revenues of $129.6 million; $125.4 million of the revenues came from outright sales.

On a fully diluted basis, the earnings per share were $.80 for the three-month period and $3.53 for the nine months.

For the nine-month period, the condensed balance sheet showed an extraordinary credit of $9.9 million as the result of a tax benefit from a net operating loss carryforward. However, no credit was taken for the quarter ended Sept. 30.

That extraordinary item accounted for $1.25 per share on the nine-month earnings, according to the statement.

Financial News

Banner Year for DG

WESTBORO, Mass. — The year 1976 was a banner one for Data General Corp., which reported record earnings and revenues for the 12 months ended Sept. 24.

Earnings rose to $28.6 million or $2.88 a share compared with $20.8 million or $2.11 a share in the previous year. Results were restated to include Digital Computer Controls, Inc., which was acquired on a pooling-of-interests basis.

Revenues grew to $254.7 million compared with $178.8 million last year.

For the final 16 weeks, earnings totaled $9.9 million compared with $7.5 million in the year-ago period. Revenues surged to $87.5 million compared with $63.5 million.

During the year, DG's employment rose to 8,590 from 6,190, using 1976 figures restated to include DCC.

Shipments of computers grew to 3,400 from 3,100, the firm said.

Memorex Earnings Up 35%

SANTA CLARA, Calif. — Memorex Corp.'s operating earnings rose 31% and revenues were up 35% during the third quarter ended Sept. 30.

Before tax credits, Memorex's operating earnings reached $8.4 million compared with $6.4 million in the year-ago period. Including a $5.7 million tax credit, quarter earnings totaled $14.1 million or $2.19 a share compared with $10.3 million or $1.80 a share in the 1976 period, when there was a $3.9 million credit.

Revenues reached $114.1 million in the quarter compared with $84.3 million in the same period last year.

For the nine months, the firm earned $40.9 million or $6.10 a share, including a $16.3 million credit, compared with $28.5 million or $4.55 a share, including a $10.8 million credit, in the year-ago period.

Nine-month revenues totaled $326.1 million compared with $244.6 million in the same period last year.

The nine-month figures for 1977 include the operating results of Business Systems Technology.

Memorex said it reduced its total debt by $5.5 million in the quarter from $148.9 million to $143.4 million. Cash and temporary investment balances at the end of September dipped to $35.8 million from $40.2 million a year ago.

Total shareholders' equity increased to $98 million from the $80.9 million reported at the end of the second quarter, the firm said.





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Control Data Corp. expects data services revenues, which are growing at a compound rate of over 20%, to reach $300 million in 1977, according to Robert M. Price, president of the firm's computer group.

The market for data services is now about $6 billion to $7 billion and should reach about $11 billion by 1980 in the U.S. and Western Europe, he said.

Sales of peripheral products were up 32% in the first three quarters of the year compared with the same period last year.

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IBM declared a regular quarterly dividend of $2.50 per share on common stock payable Dec. 10 to holders of record Nov. 9

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Storage Technology Corp. is offering to repurchase the total outstanding amount of convertible subordinated notes due 1993 through Nov. 14, which could cost the firm $7.9 million.

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CIRCULATION DEPARTMENT

CDC Units Read, Sort Micr Documents

MINNEAPOLIS — Control Data Corp. has announced two magnetic ink character recognition (Micr) document-processing units that it said can read and sort encoded checks, credit card charges, etc. at over 35,000 document/hour.

The 92660 reader/sorter separates magnetically encoded documents according to predetermined sets of characteristics and sorts similar groups into six individual pockets.

The 92660 can process intermixed documents of various sizes that meet American Banking Association specification at rates up to 830 6-in. document/min, CDC said.

The unit can be remotely located and costs $28,000 in single quantities.

The larger 92680 has 14 document pockets and can handle optical character recognition and optical mark reading at the same time it is reading and sorting magnetically encoded documents, the firm said. Options for the unit include off-line sort and outsort/edit, which verifies documents, CDC said.

The 92680 costs $58,000, it added, and quantity prices are available for both units. CDC can be reached through P.O. Box O, Minneapolis, Minn. 55440.



Control Data Corp.'s Model 92660 reader/sorter reportedly sorts over 35,000 documents per hour.

Talos Unwraps Digitizer

SCOTTSDALE, Ariz. — Talos Systems, Inc. is offering a digitizer for the OEM market which has an 11-in. by 11-in. active surface area.

The Simple One combines benefits of source data entry, menu selection and display manipulation with precise graphic data input, the firm addd.

The unit has 200 line/in. resolution and ± .02 in. accuracy. A 16-bit binary interface is standard, but an RS-232C costs $200 in single unit or $145 in quantity.

Talos Systems, Inc. is at 7419 E. Helm Drive, Scottsdale, Ariz. 85260.

OEM Products

The Simple One is a self-contained unit with stylus priced at $995 in quantities of 100. It can replace joysticks, lightpens and trackballs for CRT cursors as well as provide precision graphics capability, according to the firm.

VRC Memories Hold 37.9M Bits

N. SPRINGFIELD, Vt. — Vermont Research Corp. is delivering fixed-head memories that have a 37.9M-bit storage capacity and access time of 8.5 msec.

The 4016-DC, designed for use in telecommunications systems where power interruptions cannot be tolerated, operates on 48 VDC input power.

The Model 4016-DC costs $13,390 and the AC unit is $12,370 when purchased in quantities of 100 per year from the firm at Precision Park, North Springfield, Vt. 05150.

Impact Printer Bows

NEW YORK — C. Itoh Electronics, Inc. has announced a 40-column dot matrix impact printer with guaranteed continuous duty head life of 100 million characters.

Printing speed is 2.5 line/sec and the price in sample quantities is $210 each for the second-generation Series 500 units.

C. Itoh is at 280 Park Ave., New York, N.Y. 10017.

Part & Parcel

A large alpha numeric LED matrix display called "Datablox" has been introduced by Chicago Miniature Lamp Works for use in illuminated displays. The Datablox provides alphanumeric digits 4 in. by 3 in. and uses 35 (5 x 7 matrix) high-intensity LEDs mounted in individual reflectors. The cost is $60 each or $40 per 100 from 4433 N. Ravenswood Ave., Chicago, Ill. 60640.

•••

Maxi-Switch Co. has introduced a Selectric-style keyboard that can also be ordered with a 12-key numeric pad. The basic keyboard cost is $115 in small quantities from 9697 E. River Road, Minneapolis, Minn. 55433.

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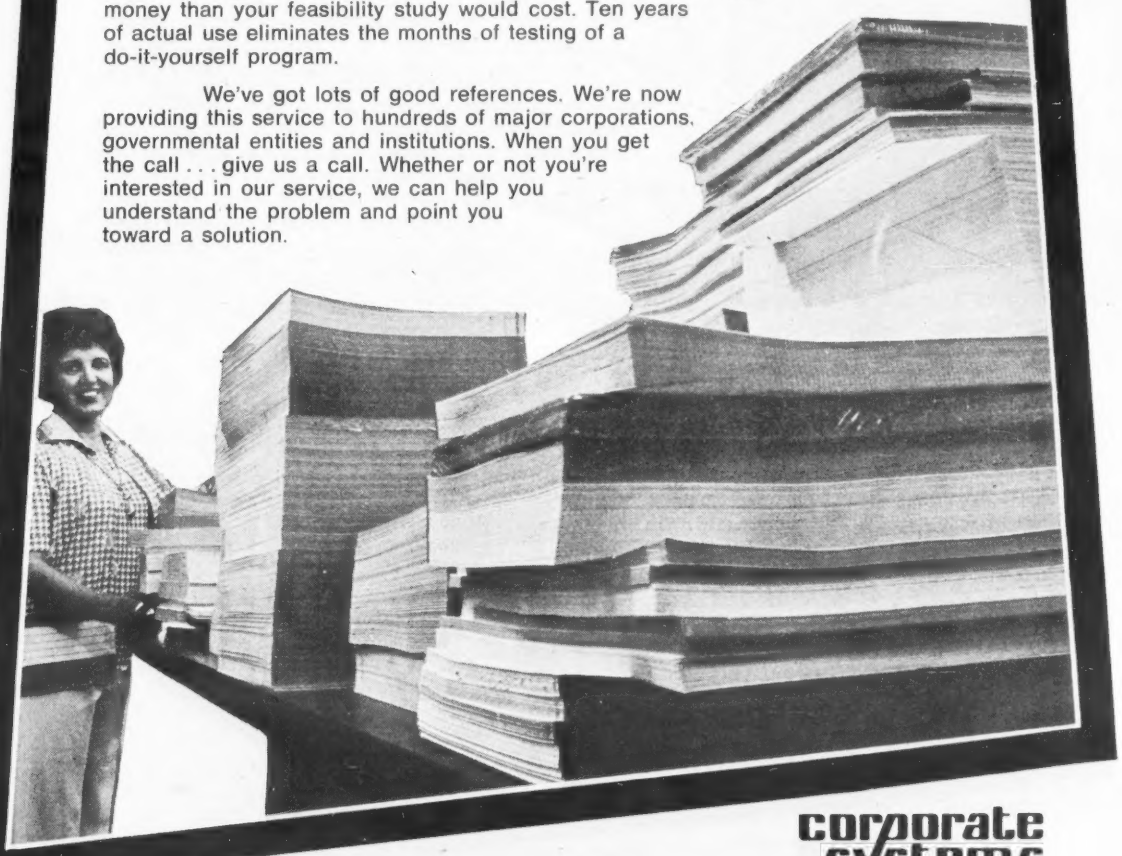
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Intel 8-Bit Micro Costs $3

SANTA CLARA, Calif. — Intel Corp.'s Microcomputer Division has announced an 8-bit microcomputer that costs $3 in large OEM quantities.

The 8021 single-chip system contains an 8-bit control processor with a 10 microsec instruction cycle time, the firm said.

The 8021, which has been optimized for control applications, is the low end of the MCS-48 microcomputer product line. It executes over 60 different instructions, a subset of the 8048 instruction set, with no instruction requiring more than two cycles to execute, Intel said.

The 8021 also has 64 bytes of read/write data memory, 1K byte of program memory, 21 I/O lines and all other generally required functions such as programmable interval timer/event counter and system clock and oscillator, the firm said.

The 8021 can operate off dc voltage in the range of 4.5V to 6.5V. Programs are stored in masked read-only memory.

Microcosm

The unit has an on-chip oscillator that can be externally synchronized with a crystal or a TTL-level clock signal, Intel said.

Product development is supported by the other MCS-48 features and by the EMB-21 emulator board, the firm said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Rockwell Adds 32K Static ROM

ANAHEIM, Calif.— A 32K static n-channel read-only memory (ROM) has been designed by Rockwell International to support the company's R6500 microprocessor family and to be compatible with other microprocessors.

The RS2332 features a typical access time of 250 nsec and uses 350 mW of power. One +5V power supply is required, the firm said.

Asynchronous Operation

The unit operates totally asynchronously and requires no clock input and is organized with 4K words by 8 bits.

The RS2332 has the same pinout as the 2316 ROM with pin 18 being an address pin instead of a chip select.

Packaged in a 24-pin plastic package, the Rockwell R2332 is priced at $20.10 in quantities of 1,000.

Rockwell is at 3310 Meraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Astral Offering One-Board Unit

PALO ALTO, Calif. — Astral Computer Co. is offering the 2000 microcomputer, which is based on the 6800 microprocessor. The unit is available as a single-board computer or in a case complete with power supply and mother board.

Separate cards contain the processor, memory, I/O and floppy disk interface.

System Support

The system is supported with extended 8K Basic, assembler, a text editor and disk operating system, Astral said.

The processor provides direct memory addressing through cycle stealing, a spokesman added.

The 2000 with Astral Basic on erasable programmable read-only memory and one 8K random-access memory board costs $2,450 each for less than nine units and $1,600 each for over 50 units from the firm at Suite 2, 991 Commercial Street, Palo Alto, Calif. 94303.

System Debugs Pace Designs

SANTA CLARA, Calif. — The Low-Cost Development System (LCDS) from the Microcomputer Group of National Semiconductor Corp. lets engineers develop, test and debug Pace hardware and software designs for a basic cost of $585.

The Pace LCDS card consists of a 16-bit Pace microprocessor, 1K words of random-access memory (RAM), sockets for 1K words of programmable read-only memory (Prom), a 20-key dual-function keyboard, a six-digit LED display, a system-timing element, input/output buffers and bidirectional transceiver elements.

The Pace LCDS is priced at $585 each while the IPC-16C/011 RAM cards cost $170 each.

The IPC-16C/012B Prom cards with blank sockets cost $139 and the IPC-16P/802 cable assembly $145.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Futuredata System Tests Two Micros

LOS ANGELES — Futuredata Corp. is offering a system that it said permits testing of two different microcomputer-based systems simultaneously.

The Universal Dual Microcomputer Development System consists of two tape-based 8K systems including two CRTs, keyboards, tape units and operating software and manuals.

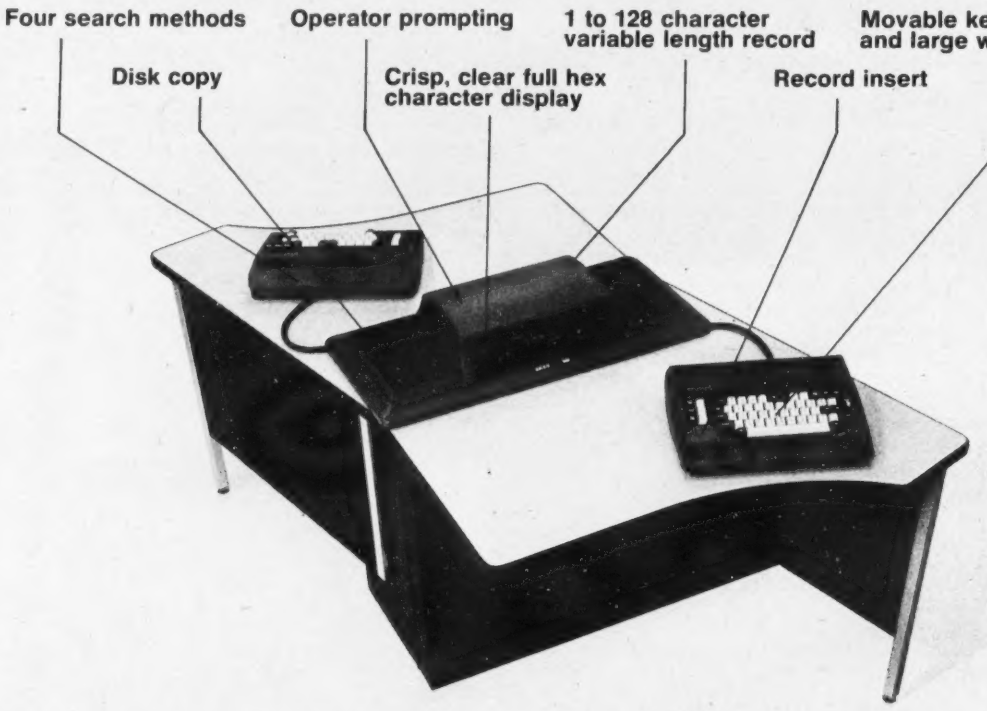
It costs $5,850 and includes a choice of 8080, 6800 or Z80 microprocessors for each half of the system.

Futuredata, which was formerly Microkit, Inc., is at 11205 S. La Cienaga Blvd., Los Angeles, Calif. 90045.

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National Cards Aid Control System Design

SANTA CLARA, Calif. — National Semiconductor Corp.'s SC/MP-II family of microcomputer CPU, read/write memory and read-only memory boards is said to reduce overall system costs by incorporating features that eliminate decoders, latches and other external devices normally required for control systems.

The ISP-8C/100N CPU gives 1 microsec per microcycle instruction-execution and requires a single +5V power supply, the firm's Microcomputer Systems Group said.

12-Bit Address Bus

Although the SC/MP-II processor is an 8-bit device, communications between the CPU and memory/-peripherals are through a 12-bit address bus and an 8-bit bidirectional data bus, the firm said.

Built-in logic allows multiprocessor and direct memory access applications. The unit also has single-bit control and sense lines build into the chip, the firm said.

In quantities less than 10, the ISP-8C/100 CPU boards cost $250 and the ISP-8C002N board with 2K by 8 bits of random-access memory costs $160. The ISP-8C/004P programmable read-only memory (Prom) card, with 4K by 8 bits, costs $525.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

Intel Has 16K RAM Family

SANTA CLARA, Calif. — Intel Corp. has unveiled its second family of 16K-bit random-access memories (RAMs), the 2117, which provides direct replacements for all types of first-generation 16K RAMs, the firm said.

The 2117 is based on the same N-MOS process used to produce the Intel 2116, but the chip design gives the 2117 the highest performance achieved to date in producing 16K RAMs, Intel claimed.

Other Models

The 2117-2 has 150-nsec maximum access and 320-nsec read or write, while the 2117-3 with 200 nsec maximum access has 375-nsec read or write. The 2117-4 has 250-nsec maximum access and 410-nsec read or write, the firm said.

The 2117 replaces the latched 2116 as well as the unlatched 4116 and a system designer can use a new 2117 clock mode that provides the equivalent of a latched output, the firm said.

In quantities over 100, the 2117-2 costs $55, the 2117-3, $41, and the 2117-4, $39. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Zilog Adds 4K Static RAM

CUPERTINO, Calif. — Zilog, Inc. has expanded from microprocessors into the realm of memories with production of its 4K static random-access memory (RAM), the Z-6104, which the firm said has access time of 200- and 250 nsec.

The Z-6104 is pin-compatible with Mostek's MK 4104, Zilog said.

Zilog said it plans to offer the Z-6104 with an access time of 100 nsec.

The 200 nsec RAM costs $22 in quantities of 100 to 999 in ceramic packages and the 250 nsec version is priced at $20.

Zilog is at 10460 Bubb Road, Cupertino, Calif. 95014.

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Rockwell Extends PPS Line

ANAHEIM, Calif — Rockwell International has expanded its line of PPS-4/1 one-chip microcomputers with the PPS-4/1 Model MM76C, which incorporates a programmable high-speed counter/timer.

The P-channel unit can "crunch numbers" or control functions and simultaneously count inputs, events, perform timing and program fixed intervals, among other operations, Rockwell said.

It has five input control lines and 32 I/O ports that include serials I/O capabilities that in combination with an on-chip clock circuit enable it to be directly synchronized with or by another microprocessor system.

The MM76C uses the MM76 instruction set and the same assembler program. The functions of two instructions are redefined to program the 14 different operating modes.

The one-chip microcomputer also contains a 48 by 4-bit random-access memory and a 640 by 8-bit read-only memory, Rockwell said.

The Rockwell PPS-4/1 MM76C is priced at $3.90 each for a minimum quantity of 1,000. In large quantities, prices drop to less than $3.

Rockwell is at 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

National Unveils RAM-I/O Chip

SANTA CLARA, Calif. — National Semiconductor Corp. has developed a combined random-access memory (RAM) and I/O chip designed for low-end systems that may require relatively small memory but need a number of peripheral interfaces.

The INS8154, an n-channel, 40-pin circuit, contains 128 8-bit words of static RAM and two 8-bit parallel I/O ports that are bit-programmable, the firm said.

Each I/O pin may be defined as either input or output.

The circuit interfaces directly with SC/MP II, INS8080A and other National Semi microprocessors, the firm said.

The INS8154 costs $8.75 in plastic in lots of 100 or more from National Semiconductor Corp. at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

MMI Offers 8K ROMs With 55 Nsec Access

SUNNYVALE, Calif — Monolithic Memories, Inc. (MMI) has 8K bipolar read-only memories (ROM) with a 55 nsec access time priced at $10 each in volume. The first time masking charge is $750 per pattern in minimum quantities of 100.

The three versions are 20-, 22- and 24-pin packages, all designed as replacements for other vendors' memories.

MMI is at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Synertek's 32K ROM Has 450 Nsec Access

SANTA CLARA, Calif. — Synertek has introduced a 32K read-only memory (ROM), the SY2332, which it said features an access time of 450 nsec.

The SY2332 is organized as 4K words by 8 bits, requires a single 5V power supply and is completely TTL compatible, the firm said.

Available in either ceramic or plastic 24-pin packages, it costs $35 each in quantities of 100 to 999. There is a one-time tooling fee of $750 to $1,000.

Synertek may be reached through P.O. Box 552, Santa Clara, Calif. 95052.

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SYSTEMS ANALYSTS
PROJECT LEADER
SENIOR PROGRAMMERS

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Eastern Washington University, near Spokane, has an opening for a Systems Analyst/Programmer with a minimum of two years programming experience, including some systems analysis work, using COBOL. An appropriate degree is preferred, but, experience may be substituted for educational qualifications. Duties include development of design specifications and writing complex program instructions for administrative systems development. Duties will be performed at a State-wide Service Center located on one of the Northwests' most beautiful University campuses. Salary to 18K with excellent fringe benefits. Apply by Nov. 23, 1977 to Personnel Director, Eastern Washington University, Cheney, WA 99004. An Equal Opportunity Employer, (M/F).

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Candidates should have a minimum of 2 years commercial or engineering applications programming experience and a minimum of 1 years' exposure to application system design. BS/BA degree in Computer Science or any field with demonstrated exposure to computers and data processing is required. Responsibilities would include application system design, programming, installation and post-installation support for standard domestic and international field data processing systems. Knowledge of any one or all of the following: FORTRAN, COBOL, BASIC, APL, and/or Machine Language. Exposure to major operating systems software and JCL. Experience in programming WANG 2200 series computers and in distributed processing, telecommunications interface to IBM Systems/370, OS environment would be an asset. Successful candidates must be flexible and willing to travel.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years commercial applications programming experience and a minimum of 1 years' exposure to application system design, preferably with Systems/370 in an OS environment, using COBOL language. BBA in Information Sciences or BS in Computer Science is desirable. Mark VI experience is preferred and a knowledge of accounting and financial applications is a definite asset.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years experience in the Timeshare/RJE/Telecommunications field with major effort directed towards support and development of timeshare systems. Timeshare experience desired in CMS or TSO. Solid technical ability in NCSS, Informatics or TYMSHARE systems acceptable with additional knowledge of other timeshare systems. Required languages include PLI, FORTRAN. Secondary knowledge in Assembler, BASIC, APL and COBOL is desired. BS/BA degree preferred. Strong technical work history will be evaluated as a substitute for technical degree.

Morrison-Knudsen offers competitive salaries, liberal fringe benefits and an excellent location. Interested applicants should request an application from:

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SYSTEMS SPECIALIST

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- Heavy experience in design and analysis of major systems plus strength in JCL.
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intel

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Telemed Corporation, a leader in the fast growing automated health care industry, has immediate openings for talented, committed professionals to serve as analysts within the Information Systems group. These analysts must have a strong applications background and be able to take a project from start to finish, including definition, design, programming and implementation. Knowledge of COBOL is essential; background in data base systems and experience with the DEC System 10 would be an added plus.

Telemed provides a challenging and stimulating environment for professional growth, with the latest in computer technology and information systems. Business applications development is done on in-house DEC KL-10 Timesharing system, with your own CRT for on-line program development. These positions offer an opportunity to interface with top corporate management and propose solutions to real problems. Salary will be commensurate with your background, experience and potential contribution to the company.

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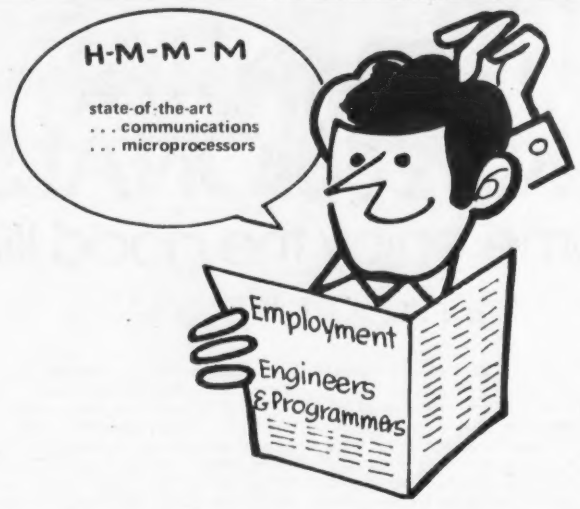
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CSD not only offers you a state-of-the-art technical environment, but also a lifestyle which will offer you the best of both worlds. Columbia, which is close to the seashore and mountains, enjoys the lifestyle of both city and country living with fine recreational facilities for tennis, golf, fishing, camping and water sports. The area also has excellent housing opportunities, low taxes, and is the home of the University of South Carolina.

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- Knowledge of characterization and qualification requirements of LSI

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A degree in engineering, math or computer science required. Recent graduates will also be given consideration. For immediate response, please send your resume with salary requirements in complete confidence to:

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Mr. Ken Uhlig
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NEW YORK
M&T Bank Building
4455 Transit Rd.
Williamsville, N.Y. 14221
(716) 632-0400

OHIO
400 Ohio One Bldg.
25 E. Boardman St.
Youngstown, Ohio 44503
(216) 744-4361

SOUTH CAROLINA
Jefferson Square Bldg.
1801 Main St.
Columbia, South Carolina 29201
(803) 779-2080

Sanford Rose Associates

Systems & Procedures Analyst

Our Corporate M.I.S. Department in downtown Pittsburgh is seeking an individual to formulate user guides and instruction manuals for computerized systems, establish guidelines for records retention and analyze office procedures and methods.

The successful candidate will have a bachelor's degree in Computer Science or related area, plus a minimum of 2 years experience in systems analysis and/or programming, preferably, in a manufacturing environment. Applicants should be user-oriented and have good technical writing skills.

Please submit resume including salary history to: Supervisor, Salaries Employee Relations.

JOY Manufacturing Company
1200 Oliver Building
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PROGRAMMER ANALYST

The Glass Division has an immediate opening for a COBOL Programmer/Analyst with experience in TOTAL and ENVIRON 1 data base.

BS Degree in Computer Science, Mathematics or Business is desirable.

Competitive salary and fringe benefit program.

Candidates meeting these requirements should submit a detailed resume, including educational background, salary history, work experience and salary requirements to:

Ford
Glass Division
Attn: Mr. Roy D. Seifried
Salaried Personnel
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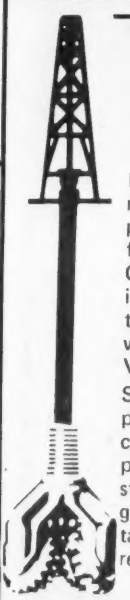
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Computing Services Center
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Wayne State University
Detroit, MI 48202
or call (313) 577-1953 for more information.

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of PHOENIX

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Send resume to: Dr. Wallace E. Killcreas Div. of Numerical Services Mississippi State University P.O. Drawer CC Mississippi State, MS 39762

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Responsible for the programming and related functions of the University's PLATO project. Minimum qualifications require equivalent of bachelor's degree with 1-2 years PLATO experience or associate degree with 4-7 years PLATO experience. Experience with other CDC software applications is desirable.

This position represents an opportunity to work within a centralized university computing center which utilizes not only a CDC CYBER but also a Burroughs 7700; DEC-10 and 11/70; and HP2000 access system.

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QUALIFICATIONS:
B.A. in a Computer Science field and a minimum of five years' progressively responsible experience to include user interfacing, systems analysis and network design. Three years must be in management to include budget management and staff supervision. Must be able to communicate effectively in lay terms. $22,000 - $26,000 annually, depending upon qualifications.

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The individual we seek must have 3-5 years programming experience in ANS COBOL within an OS environment, with 1-2 years as a programmer/analyst. Must possess a good working knowledge of financial and general applications. Specific functional responsibilities will include analyzing, designing, coding and testing commercial systems. BS degree in business, computer science or equivalent experience desirable.

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Develop proposals to companies with data processing needs. (Main frame & mini-computer systems). Conduct demonstrations of systems capabilities. Specific responsibilities to develop new accounts in defined areas. Opening today in southern based corporation. Two to four year sales experience in hardware/software data systems. Lucrative compensation package.

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Analyze a company's business activity to determine data processing needs. (Main frame & minicomputer systems). Develop proposals with systems and industry specialists to establish new accounts for expanding data hardware/software systems corporation. Immediate need. Client will interview now. Lucrative compensation package.

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Include salary info. & requirements

Wanted... Computer performance specialists with a passion for analysis.

We are seeking imaginative individuals to contribute to Data General's computer performance evaluation (CPE) organization. The group's activities will include development of performance tools and methodologies for existing as well as future Data General architectures.

Preferably you should have experience with software/hardware instrumentation, simulation, analytical methods, and performance analysis. Work with interactive workload characterization would be a definite plus.

We want group oriented professionals to solve interesting problems in performance and fill responsible positions in our Development Methods Department. Knowledge of AOS or RDOS is desirable.

Please send resumes, in confidence, complete with salary history to Jim Stewart, Data General Corp., 15 Turnpike Road, Westboro, MA 01581. Or call him between four and six P.M. Eastern Standard Time, Mon.-Wed. at (800) 225-7347, ext. 3065, (In Massachusetts call collect (617) 485-9202, ext. 3065).

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Our client, a rapidly growing telecommunications equipment manufacturing firm is seeking mini/micro software professionals proficient in FORTRAN, assembler, or PL1 who are interested in developing state-of-art digital communication systems. Candidates should have a BSEE or BSCS, plus 1-4 years experience with real-time systems, networking, voice concentrators or related software/firmware projects. Excellent salaries, benefits and growth potential. An equal opportunity employer. Call or send resume to:

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We welcome the professional who is highly motivated in the direction of creativity, fresh conceptualization, and imaginative problem-solving, in state-of-the-art design and software development of small to medium real time systems.

PROJECT LEADERS SOFTWARE DEVELOPMENT

- SOFTWARE DEVELOPMENT or maintenance, with hands-on experience with multiprogramming operating systems and/or language compilers (FORTRAN, COBOL, PL/1, etc.) Familiarity with SEL Real-Time Monitor desirable.
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- PROJECT LEVEL responsibility for data base management of minicomputer-based communications systems.

REQUIREMENTS: Growth has created many openings. At least 2-4 years R&D experience is needed in one or more of these areas, 6-10 for higher and project levels. Relevant degree required, advanced degree highly desirable. Starting salaries will fully reflect your qualifications, with liberal benefits additional. Please send resume and/or letter of information detailing achievements and current salary in confidence to Dan Squires, Employment Manager, Dept. S1114 CW.

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ASSISTANT DIRECTOR

Supervise daily operations, staff of 15; help with policy and planning for computing installation supplying instructional support to College of Engineering. Large Harris midicomputer, upgrading to virtual memory, multiprogramming OS. BS in Engineering or Comp. Sci. thorough knowledge of Fortran, required; systems programming expertise, supervisiory experience preferred. Salary $12,000 to $18,000. Send resume to: C.H. Davidson, Engineering Computing Laboratory, University of Wisconsin, Madison, WI 53706

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SENIOR PROGRAMMER ANALYST

Responsibilities include development of system and hardware specifications in a multidisciplinary Health Sciences Centers environment. Qualifications: Bachelor's degree, advanced degree in computer sciences desirable, minimum of five years experience in design and implementation of computer systems in health care field using data communication (teleprocessing) and statistical computing techniques is MANDATORY. Salary commensurate with qualifications. Send resume to Texas Tech University Health Sciences Centers, Personnel Division, P.O. Box 4569, Lubbock, Texas 79409. Applications must be received by November 15, 1977. An Equal Opportunity Employer.

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Our client company, a local computer manufacturer, is currently looking for several support and development programmers for up to 40% travel to these and other European installations.

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The manufacturer is listed in the N. Y. Stock Exchange and has enjoyed an average 30% growth rate over the last 5 years. To you this means security, opportunity for advancement and the finest benefit portfolio available. These positions pay between 16-22K and must be filled immediately.

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We are looking for professionals who can help us build a large data processing organization to support a huge construction effort in the Middle East.

Morrison-Knudsen, a major engineering and construction firm, is the managing partner in the Morrison-Knudsen Saudi Arabia Consortium. MKSAC is involved in the construction of a city in Saudi Arabia, including all infrastructure, from the sand up. Domestic headquarters for MKSAC have been established in Columbia, Maryland. We are now ready to build the large scale data support organization. Immediate openings include:

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The operating environment includes MVS, JES2, and TSO. CICS and DL/1 will provide the on-line and data base environment.

Experience with structured design and programming concepts are desirable to support the implementation of the project's systems. On-line systems experience using CICS is also needed. Specific applications include general ledger, accounts payable, project scheduling, material control (engineering take-off, procurement, expediting and inventory), personnel, construction equipment management, and records management. Languages utilized will be COBOL and MARK IV.

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Requires strong analytical skills and 3-5 years business consulting or systems problem solving experience in a manufacturing environment, with expertise in the financial, costing, inventory & production control functions. Should also have 2-3 yrs in multiple computer system implementation. BS necessary. MBA an asset.

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Experienced in Computer Systems Development, to plan, organize, lead the design, programming and implementation efforts for our distribution and manufacturing systems. Requires 5-7 years batch and on-line experience in systems and programming, demonstrated ability in project management and thorough knowledge of IBM equipment. Familiarity with distributive processing desired, college degree preferred.

Successful candidates will be management-oriented with excellent written and oral communication skills. To explore these unique growth positions offering attractive compensation and benefits package please send resume with earnings record in confidence to:

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PROGRAMMER/ANALYST

Newspaper group has an immediate opening for an individual with knowledge of DEC PDP-11 with RSTS operating system. Will be responsible for development, installation and maintenance of business systems in the BASIC PLUS, BASIC PLUS 2 and RPG programming languages at local newspaper sites.

An unusual opportunity for the right individual to advance the state of the art in on-line interactive business applications. Excellent growth potential, competitive salary and fringe benefits. Some travel necessary. All replies will be held in strict confidence. Send resume and salary requirements to:

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MIS Management Opportunities

Austin Industries' newly formed information systems department is looking for a top analyst to manage the construction systems section. This analyst must have excellent analytical and conceptual skills to head up a systems planning effort in a multi-company environment. The ideal candidate should have come up through the programming ranks and have a firm knowledge of data base design concepts.

This person must have experience in estimating, job planning, scheduling, cost engineering, progress reporting and materials planning for construction projects.

Austin Industries is a diversified construction and manufacturing organization. The corporate subsidiaries engage in virtually every type of heavy and commercial construction activities and also manufacture two leading brands of farm machinery.

If you want the challenge of developing and implementing an integrated MIS plan for a major corporation, please contact Ed Moore at 2949 Stemmons Freeway, Dallas, TX 75221, or call (214) 630-5100, ext. 410 for consideration.

Austin

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A challenging technical/management opportunity is current available with one of the nation's largest educational computing networks.

Primary responsibilities will include:

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- Systemwide technical advice and consulting services for the design and evaluation of computer techniques in serving extremely complex data processing problems in a network environment.
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- Involvement with adaptation of the State of California ATSS/DS communications network to meet varied and changing academic requirements.

Successful candidate will have a BA or BS, preferably in a computer related field, and a detailed knowledge of systems analysis principles and techniques using modern computer hardware and software. Requires 5 years of progressively responsible technical and management experience. Two of the 5 years must include working with the internals of DEC RSTS/E or CDC KRONOS/NOS operating systems or combination of both.

Compensation for this responsible position, located in the Los Angeles Miracle Mile area, ranges from $23,352 to $28,188. This position is exempt from Civil Service testing. Resumes should be received no later than November 25, 1977 and should be addressed to:

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Send resume to:
Dr. Wallace E. Killcreas
Div. of Numerical Services
Mississippi State University
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Plans, organizes, and controls Computer Operations Section in operation of Computer and Peripheral Data Processing equipment. Has full charge of all activities of Equipment Operations. Established schedules for maximum utilization of equipment. Assigns personnel to operations. Instructs and trains personnel where necessary. Coordinates activities with other Data Processing sections. Two years experience in supervisory position desirable. Contact Vance B. Nelson, Computer Services, Michigan Technological University, Houghton, MI 49931. An equal opportunity educational institution/equal opportunity employer.

PROGRAMMERS/OPERATORS

IMS/PARS Applications Programmers

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PROGRAMMER ANALYSTS

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If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to:

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Federated Department Stores, Inc.

Systems Research & Development, Room CW-1114
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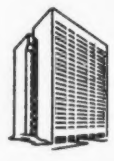
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Continued growth and expansion in Hennepin County's Data Processing Department has brought all these factors together. We're offering these winning positions to experienced COBOL programmers. Advantages include challenging responsibilities in a large scale IBM shop combined with excellent opportunities for advancement. The County also offers a liberal salary and benefit package.

We are currently involved in developing applications in a variety of areas. If you desire a change from your normal routine and are anxious to assume greater responsibility, this is the ideal work environment for you. Send your resume in complete confidence to:

Dave Sier
Hennepin County
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Hewlett-Packard 3000
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The Senior Analyst will operate as the project leader of a small team and assume total responsibility for the installation, start-up, and continuing support of a large HP 3000 minicomputer system. Initial development effort will be in Inventory and Purchasing areas.

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BASF

Director of Academic Computing Services

Applications are sought for Director of Academic Computing Services. George Mason University, the State University in Northern Virginia, with 9500 students is located in Metropolitan Washington, D.C. It offers 39 Baccalaureate and 17 Masters programs.

This is an opportunity to participate in the development of a university computing center. Minimum qualifications include MS in Computer Science or related field, 2 years experience in Computing Center operations, programming experience in high level languages, and an ability to work with a wide variety of computer users.

It is desired that the successful candidate have some knowledge of systems programming, experience in an academic computing environment and some evidence of administrative ability. Salary is commensurate with qualifications and experience. The position is available 1 February 1978. Send resumes and names of three references by 1 December 1977 to Professor Stephen B. Seidman, Graduate School Office, George Mason University, 4400 University Drive, Fairfax, VA. 22030. An EEO/AA employer.

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We're looking for highly motivated systems software salesmen with experience selling to the IBM DOS and DOS/VS marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

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Knowledge of the following computers is desirable:

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M.I.S. INTERNATIONAL, INC.

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(313) 326-7010

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This lead position is in development of new Interactive Graphics Systems with emphasis on software for distributed processing. Candidates are required to have a minimum of 4 years experience in graphics software and/or distributed processing. An advanced degree in Engineering or Computer Science is desirable.

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- **DEC PDP 8/11 . . . and**
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We offer a liberal compensation and benefit package including profit sharing. Please send resume, including salary history or call:

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Midwest Payment Systems
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Cincinnati, Ohio 45202
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Programmer Analyst/Systems and Procedures Analyst

Star-Kist Foods has immediate openings for Senior Systems and Procedures Analyst, and two Senior Programmer/Analysts. Must be self-starting individuals with 5 years manufacturing or distribution background, with appropriate education.

Methods and Procedures Analyst must analyze, develop, and implement procedures and policies for computer or manual systems, design and control company forms, and be able to communicate with all levels of management.

Senior Programmer Analyst with design, program and implement business applications, be proficient in ANS COBOL on IBM 360 or 370 computer using DOS. He will be involved with on-line (CICS) or data base (DL-1) application systems.

We offer competitive salaries, extensive fringe benefits and fantastic climate. Send resume and salary history to:

STAR-KIST FOODS, INC.
Box 3306
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SYCOR

SYCOR CONTINUES ITS PROGRAM OF NATIONAL EXPANSION!

As a leading force in the technological development manufacture of distributed data processing systems, our need for Systems Engineering and Sales Professionals continues to grow. Openings exist in major cities throughout the U.S. for career-oriented people in the following areas:

SYSTEMS ENGINEER

COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

SALES REPRESENTATIVES

Requires a minimum of 3 years terminal, peripheral or small systems sales experience, plus a general knowledge of DP applications including communications. Candidates must display the proven ability to meet sales quotas for a complete line of computer products and support services.

We offer a competitive range of salaries, comprehensive benefits and highly visible opportunities for future growth. To arrange an interview, send your resume to:

SYCOR, INC.
100 Phoenix Drive
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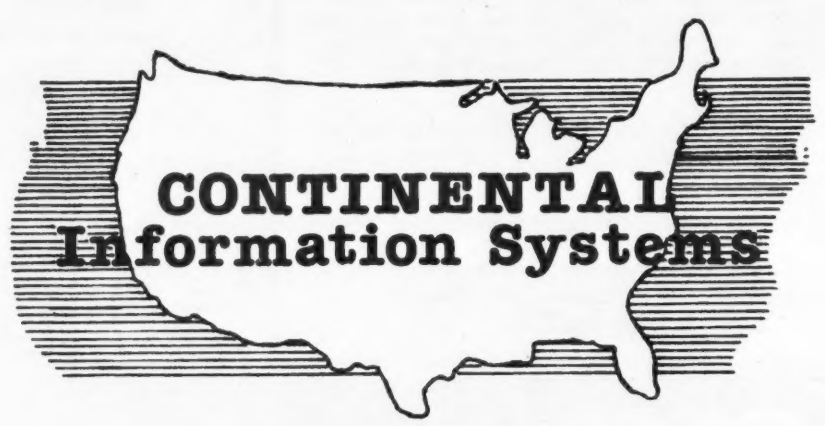
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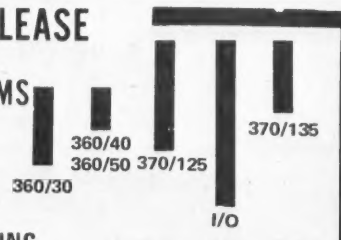
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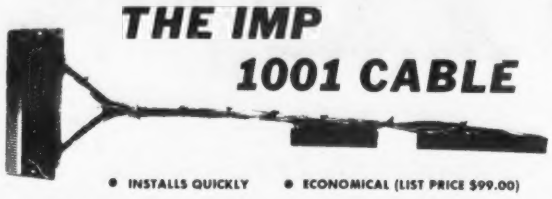
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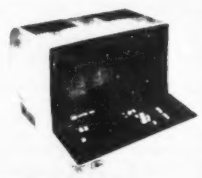
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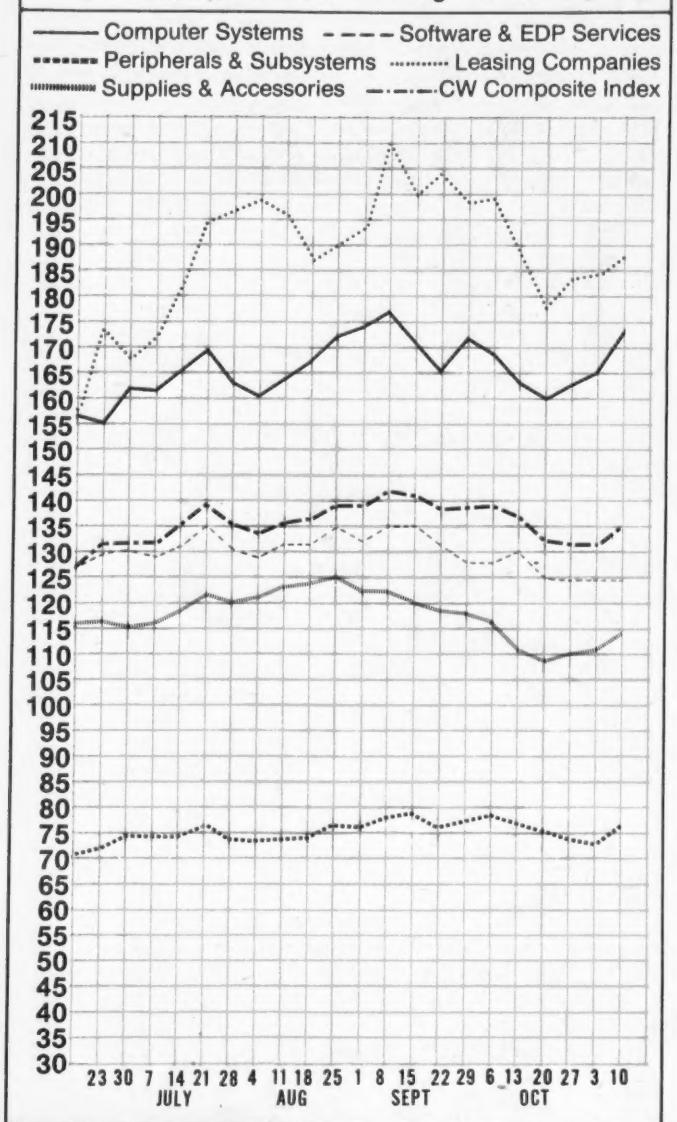
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Earnings	1,303,000	1,633,000
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Earnings	3,398,000	7,114,000

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Revenue	230,569,000	206,377,000
Earnings	3,800,000	3,055,000

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Tax Cred	420,000	.....
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Earnings	512,000	499,000
6 Mo Shr	.32	.29
Revenue	30,030,000	30,383,000
Tax Cred	156,000	201,000
Earnings	940,000	852,000

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 9, 1977

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	42 1/4	+4 1/4	+11.1
N	BURROUGHS CORP	55- 91	65 3/8	+1 1/2	+2.3
O	COMPUTER AUTOMATION	18- 30	24 5/8	- 1/8	-0.5
N	CONTROL DATA CORP	20- 26	21	+1	+5.0
O	CRAY RESEARCH INC	15- 29	24 1/2	+3 1/4	+15.2
N	DATA GENERAL CORP	35- 51	48	+3 3/8	+7.5
N	DATAPOINT CORP	18- 34	34 1/4	+2 5/8	+8.3
N	DIGITAL EQUIPMENT	37- 53	45 1/4	+1 3/4	+4.0
N	ELECTRONIC ASSOC.	2- 3	2 1/8	+ 1/8	+6.2
A	ELECTRONIC ENGINEER.	8- 11	9 5/8	- 1/4	-2.5
O	FOUR-PHASE SYSTEMS	13- 19	18 3/8	+1 1/4	+7.2
N	FOXBORO	41- 54	42 1/8	- 3/8	-0.8
O	GENERAL AUTOMATION	6- 9	6 1/4	+ 1/2	+8.6
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	69- 87	72 1/4	+1 7/8	+2.6
N	HONEYWELL INC	43- 55	45 3/4	+2 3/8	+5.4
N	IBM	245-286	252 3/4	+3 1/8	+1.2
O	MANAGEMENT ASSIST	5- 9	8 5/8	+ 5/8	+7.8
O	MICRODATA CORP	7- 18	11 1/8	- 1/8	-1.1
O	MODULAR COMPUTER SYS	5- 8	7 5/8	+ 3/8	+5.1
N	NCR	32- 47	41 3/8	+1 3/8	+3.4
O	PRIME COMPUTER INC	12- 23	19 5/8	+ 1/2	+2.6
N	PERKIN-ELMER	17- 22	19 1/4	+1 3/8	+7.6
N	RAYTHEON CO	16- 33	30 3/8	+1 1/2	+5.1
N	SPERRY RAND	30- 42	33 5/8	+2 1/4	+7.1
O	SYCOR INC	8- 15	14 3/4	+ 3/4	+5.3
A	SYSTEMS ENG. LABS	5- 8	7	+ 3/8	+5.6
A	WANG LABS.	10- 14	11 1/8	+ 3/4	+7.2

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 3/8	- 1/8	-2.7
O	BOOTHE COURIER CORP	8- 10	10 5/8	- 1/8	-1.1
O	COMDISCO INC	10- 13	10 7/8	+ 1/8	+1.1
A	COMMERCE GROUP CORP	1- 3	3/4	- 1/8	-14.2
A	COMPUTER INVSTRS GRP	1- 2	1	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	+ 1/8	+6.2
N	DPF INC	6- 9	8 1/8	+ 1/8	+1.5
N	ITEL	13- 22	18 3/8	+1	+5.7
N	LEASCO CORP	19- 27	25 1/8	+2 1/4	+9.8
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	+ 3/8	+6.9
N	U.S. LEASING	10- 15	13 7/8	+1 1/4	+9.9

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1/2	0	0.0
O	ANACOMP INC	7- 10	8 3/4	0	0.0
A	APPLIED DATA RES.	5- 10	7 1/4	0	0.0
N	AUTOMATIC DATA PROC	23- 30	26 5/8	+ 5/8	+2.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	10 3/4	+1	+10.2
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/8	+ 3/4	+8.0
N	COMPUTER SCIENCES	7- 9	8 1/8	+ 1/2	+6.5
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	0	0.0
O	COMSHARE	5- 8	7	+ 1/4	+3.7
O	DATA DIMENSIONS INC	3- 5	3 7/8	- 1/2	-11.4
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	15 5/8	+1 3/8	+9.6
O	INSYTE CORP	2- 3	1 1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	- 1/8	-8.3
A	LOGICON	7- 17	11 5/8	- 1/8	-1.0
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	13- 27	14 1/2	-11 1/8	-43.4
O	NATIONAL DATA CORP	4- 7	6 1/8	+ 1/4	+4.2
A	ON LINE SYSTEMS INC	16- 22	17	0	0.0
N	PLANNING RESEARCH	3- 6	4	+ 1/8	+3.2
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 3	2 1/2	+ 1/8	+5.2
O	REYNOLDS & REYNOLD	17- 20	18	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 4	3 1/2	0	0.0
O	TYMSHARE INC	14- 23	19 5/8	+1 1/8	+6.0
A	URS SYSTEMS	4- 5	4 3/4	+ 1/8	+2.7
N	WYLY CORP	1- 2	3/4	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/4	+ 3/8	+2.9
O	ADVANCED MEMORY SYS	7- 9	6 3/4	- 1/4	-3.5
N	AMPEX CORP	8- 11	9 1/8	+ 3/8	+4.2
O	ANDERSON JACOBSON	3- 5	4 1/4	+ 1/2	+13.3
N	APPLIED DIG DATA SYS	10- 20	13 1/2	+ 3/8	+2.8
O	BEEHIVE INT'L	5- 12	5 1/8	- 3/4	-12.7
A	BOLT,BERANEK & NEW	7- 9	7 1/4	+ 1/2	+7.4
N	BUNKER-RAMO	8- 12	10 1/4	+ 1/4	+2.5
A	CALCOMP	3- 5	2 3/4	+ 1/8	+4.7
O	CAMBRIDGE MEMORIES	1- 4	3	-	-2.0
N	CENTRONICS DATA COMP	20- 30	20 1/4	+ 3/8	+1.8
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6 1/4	+ 1/4	+4.1
O	COMPUTER CONSOLES	4- 7	4	+ 1/4	+6.6
A	COMPUTER EQUIPMENT	2- 3	3	+ 1/4	+9.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	- 1/8	-10.0
O	COMTEN	9- 13	9 3/4	+ 1/4	+2.6
N	CONRAC CORP	19- 28	20 5/8	+1	+5.0
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 9	8 5/8	+1 1/4	+16.9
A	DATA PRODUCTS CORP	9- 17	16 1/2	+ 7/8	+5.5
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/8	- 1/8	-7.1
O	DECISION DATA COMPUT	2- 3	1 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	9 1/4	+1 5/8	+21.3
O	DATARAM CORP	2- 12	11 1/2	+2	+21.0
N	ELECTRONIC M & M	4- 5	3 1/2	0	0.0
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 12	9 5/8	+1 3/8	+16.6
N	HARRIS CORP	28- 42	41 7/8	+4 1/8	+10.9
A	INCOTERM CORP	10- 18	17 1/2	+ 3/4	+4.4
O	INFOREX INC	4- 7	5 1/8	+ 1/4	+5.1
O	INFORMATION INTL INC	9- 14	9 1/4	- 1/4	-2.6
O	INTEL CORP	38- 57	45	+3	+7.1
A	LUNDY ELECTRONICS	3- 6	4 1/8	- 1/4	-5.7
O	MSI DATA CORP	6- 13	12 1/4	+ 7/8	+7.6
O	MEMOREX	23- 34	26 1/2	+1 5/8	+6.5
N	MOHAWK DATA SCI	5- 8	6	+1	+20.0
O	PENRIL CORP	2- 5	4 7/8	+ 1/8	+2.6
N	PERTEC CORP	7- 10	9 3/4	+ 7/8	+9.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	3- 5	3 1/4	- 1/4	-7.1
O	RECOGNITION EQUIP	6- 10	7 3/8	+ 1/2	+7.2
O	SCAN DATA	1- 2	7/8	+	+7.1
O	STORAGE TECHNOLOGY	10- 18	18 1/8	+1 7/8	+11.5
O	T BAR INC	7- 13	12	+ 5/8	+5.4
O	TALLY CORP.	4- 6	3 1/2	0	0.0
A	TEC INC	7- 10	6 7/8	- 1/4	-3.5
N	TEKTRONIX INC	29- 38	37 1/8	+ 1/4	+0.6
N	TELEX	2- 3	2 5/8	+ 3/8	+16.6
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 3/8	+ 5/8	+10.8
O	BALTIMORE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	13 3/8	+ 7/8	+7.0
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	16 3/4	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 3/4	- 1/8	-2.1
O	GRAHAM MAGNETICS	11- 17	17 1/4	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	14	-1	-6.6
N	3M COMPANY	46- 56	48 3/8	+2 1/8	+4.5
O	MOORE CORP LTD	24- 37	25 1/2	+1 3/4	+7.3
N	NASHUA CORP	16- 28	20 1/8	+ 3/4	+3.8
O	STANDARD REGISTER	18- 25	21 1/2	+ 1/2	+2.3
O	TAB PRODUCTS CO	10- 19	9 1/2	0	0.0
N	UARCO	18- 22	19 1/4	+1 1/4	+6.9
A	WABASH MAGNETICS	10- 15	13	+1 1/8	+9.4
N	WALLACE BUS FORMS	17- 21	18 1/2	- 1/8	-0.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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